APPENDIX C
ANALYTICAL DATA VALIDATION REPORTS

APPENDIX C-1
2016 SEDIMENT SAMPLES VALIDATION REPORT

Data Validation Summary
July 2016 Sediment Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Sediment samples were collected in July 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery groups (SDG) 1607903, 1608071, and 1608072. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDGs L1623546, L1623549, and L1623926. Samples were analyzed by one or more of the following: Clean Water Act (CWA, 2012) or Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Total Organic Carbon (TOC)	Lloyd Kahn	10% Stage III/ 90% Stage IIB
Alpha & Eurofins	Percent Solids (TS)	SM 2540G	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination

FD = Field duplicate limit exceeded
HT-G = Holding time for prep or analysis grossly exceeded
MS-H = MS and/or MSD recovery high
MS-L = MS and/or MSD recovery low
MS-RPD = MS/MSD RPD limit exceeded

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
Holding Times and Preservation
* Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
Matrix Spike/Matrix Spike Duplicates (MS/MSD)
Laboratory Duplicates
Field Duplicates
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

MS/MSDs

SDG 1607903 – Samples W-17-Low_072616_SED_03 and BO-04-02_072616_SED_03 were submitted for MS/MSD analysis. Sample W-21UM-EAST-C_072516_SED_03 was selected by the laboratory for MS/MSD analysis. MS/MSD percent recoveries and RPDs for samples W-17-Low_072616_SED_03 and W-21UM-EAST-C_072516_SED_03 were within QC limits; no action required. For the MS/MSD analysis of sample BO-04-02_072616_SED_03 percent recoveries (227 and 132) and RPD (53) exceeded the QC limits. Methyl mercury results for associated samples BO-04-02_072616_SED_03 and BO-04-02_072616_SED_03_DUP were qualified estimated (J) and may be biased high.

Field Duplicates

SDG 1607903 – Samples W-17-Low_072616_SED_03 and BO-04-02_072616_SED_03 were submitted for duplicate analysis. Duplicate RPD for sample BO-04-02_072616_SED_03 (34) was within the QC limit of 50; no action required. Duplicate RPD for sample W-17-Low_072616_SED_03 (102) exceeded the QC limit of 50. Methyl mercury results for associated samples W-17-Low_072616_SED_03 and W-17-Low_072616_SED_03_DUP were qualified estimated (J).

SDG 1608072 – Sample BO-04_072516_SED_03 was submitted for duplicate analysis. Duplicate RPD for sample BO-04_072516_SED_03 (53) exceeded the QC limit of 50. Methyl mercury results for associated samples BO-04_072516_SED_03 and BO-04_072516_SED_03_DUP were qualified estimated (J).

3.0 Mercury – 1631

Results were determined to be usable as reported by the laboratory.

4.0 Total Organic Carbon – Lloyd Kahn

MS/MSD

SDG L1623549 – The MS/MSD associated with sample W-21-LOW_072516_SED_03 (Rep1) had percent recoveries (177) greater than the upper QC limit of 125 for total organic carbon. The MS/MSD associated with sample W-21-LOW_072516_SED_03 (Rep2) had a percent recoveries (64/73) less than the lower QC limit of 75. The MS associated with sample W-21UM-WEST-A_07/27/16_SED_03 (Rep1 and Rep2) had percent recoveries (265 and 137) greater than the upper QC limit of 125 for total organic carbon. The unspiked sample concentrations were greater than four times the spiking concentration; no action required.

SDG L1623926 –The MSD associated with sample BO-04_072516_SED_03 (Rep1) had a percent recovery (151) greater than the upper QC limit of 125 for total organic carbon and a RPD (34) greater than the QC limit of 25. Results for TOC (Rep1) were qualified estimated (J) and are potentially biased high.

5.0 Percent Solids – 2540G

Holding Times and Preservation

SDG 1607903 – Samples W-61-HIGH_072716_SED_03, W-65-INTERTIDAL_072516_SED_03, W-65-LOW_072516_SED_03, W-65-MID_072516_SED_03, ES-15_072716_SED_03, SVE-01_072716_SED_03, OL-01_072716_SED_03, W17-N_072116_SED_03, W-17-LOW_072616_SED_03_DUP, BO-04-02_072616_SED_03, and BO-04-02_072616_SED_03_DUP were analyzed up to 25 days beyond technical hold time. Based on professional judgment, percent moisture results for these samples were qualified estimated (J).

SDG 1608071 – Samples ES-04_072816_SED_03, E-01-01_072816_SED_03, E-01-03_072816_SED_03, E-01-04_072816_SED_03, ES-03_072816_SED_03, and ES-FP_072816_SED_03 were analyzed up to 25 days beyond technical hold time. Based on professional judgment, percent moisture results for these samples were qualified estimated (J).

SDG 1608072 – Samples BO-04_072516_SED_03 and BO-04_072516_SED_03_DUP were analyzed 46 days beyond technical hold time. Based on professional judgment, percent moisture results for these samples were qualified estimated (J).

References:

Amec Foster Wheeler, 2016. "Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan", Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA"; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use"; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review"; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Wolfgang D. Calicchio January 4, 2017

Senior Reviewer: Denise King January 09, 2017

TABLE 1
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

					Method Class	Methyl Mercury	Mercury	Percent Solids	TOC
					Analysis Method	EPA 1630	EPA 1631	2540G	Lloyd_Kahn
					Fraction	Total	Total	Total	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**				
L1623926	SED	BO-04	BO-04_072516_SED_03	7/25/2016	FS			1	2
L1623926	SED	BO-04	BO-04_072516_SED_03-DUP	7/25/2016	FD			1	2
L1623546	SED	BO-04-02	BO-04-02_072616_SED_03	7/26/2016	FS			1	2
L1623546	SED	BO-04-02	BO-04-02_072616_SED_03_DUP	7/26/2016	FD			1	2
1607903	SED	BO-04-02	BO-04-02_072616_SED_03	7/26/2016	FS	1	1	1	
1607903	SED	BO-04-02	BO-04-02_072616_SED_03_DUP	7/26/2016	FD	1	1	1	
L1623549	SED	BO-05	BO-05_072016_SED_03	7/20/2016	FS			1	2
1607903	SED	BO-05	BO-05_072016_SED_03	7/20/2016	FS	1	1	1	
1608071	SED	E-01-01	E-01-01_072816_SED_03	7/28/2016	FS	1	1	1	
1608071	SED	E-01-03	E-01-03_072816_SED_03	7/28/2016	FS	1	1	1	
1608071	SED	E-01-04	E-01-04_072816_SED_03	7/28/2016	FS	1	1	1	
L1623926	SED	E-01-01	E-01-01_072816_SED_03	7/28/2016	FS			1	2
L1623926	SED	E-01-04	E-01-04_072816_SED_03	7/28/2016	FS			1	2
L1623926	SED	E-01-03	E-01-03_072816_SED_03	7/28/2016	FS			1	2
L1623549	SED	ES-02	ES-02_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	ES-02	ES-02_072716_SED_03	7/27/2016	FS	1	1	1	
L1623926	SED	ES-03	ES-03_072816_SED_03	7/28/2016	FS			1	2
1608071	SED	ES-03	ES-03_072816_SED_03	7/28/2016	FS	1	1	1	
L1623926	SED	ES-04	ES-04_072816_SED_03	7/28/2016	FS			1	2
1608071	SED	ES-04	ES-04_072816_SED_03	7/28/2016	FS	1	1	1	
L1623549	SED	ES-13	ES-13_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	ES-13	ES-13_072716_SED_03	7/27/2016	FS	1	1	1	
L1623546	SED	ES-15	ES-15_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	ES-15	ES-15_072716_SED_03	7/27/2016	FS	1	1	1	
L1623926	SED	ES-FP	ES-FP_072816_SED_03	7/28/2016	FS			1	2
L1623926	SED	ES-FP	ES-FP_072816_SED_03-DUP	7/28/2016	FD			1	2
1608071	SED	ES-FP	ES-FP_072816_SED_03	7/28/2016	FS	1	1	1	
1608071	SED	ES-FP	ES-FP_072816_SED_03_DUP	7/28/2016	FD	1	1	1	
L1623926	SED	L9-45	L9-45_072816_SED_03	7/28/2016	FS			1	2
1608071	SED	L9-45	L9-45_072816_SED_03	7/28/2016	FS	1	1	1	
L1623549	SED	OB-05	OB-05_072616_SED_03	7/26/2016	FS			1	2
1607903	SED	OB-05	OB-05_072616_SED_03	7/26/2016	FS	1	1	1	
L1623546	SED	OL-1	OL-01_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	OL-1	OL-01_072716_SED_03	7/27/2016	FS	1	1	1	
L1623549	SED	OV-01	OV-01_072216_SED_03	7/22/2016	FS			1	2
1607903	SED	OV-01	OV-01_072216_SED_03	7/22/2016	FS	1	1	1	
L1623549	SED	OV-02	OV-02_072216_SED_03	7/22/2016	FS			1	2
1607903	SED	OV-02	OV-02_072216_SED_03	7/22/2016	FS	1	1	1	

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PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

					Method Class Analysis Method Fraction	Methyl Mercury EPA 1630 Total	Mercury EPA 1631 Total	Percent Solids 2540G Total	TOC Lloyd_Kahn Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**				
L1623549	SED	OV-04	OV-04_072216_SED_03	7/22/2016	FS			1	2
1607903	SED	OV-04	OV-04_072216_SED_03	7/22/2016	FS	1	1	1	
1608071	BW	QC	Ponar_072916_SED_QC	7/29/2016	EB		1		
1608071	BW	QC	Shovel_072916_SED_QC	7/29/2016	EB		1		
1608071	BW	QC	Spoon_072916_SED_QC	7/29/2016	EB		1		
L1623546	SED	SVE-01	SVE-01_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	SVE-01	SVE-01_072716_SED_03	7/27/2016	FS	1	1	1	
L1623549	SED	W-17-High	W-17-HIGH_072116_SED_03	7/21/2016	FS			1	2
1607903	SED	W-17-High	W-17-HIGH_072116_SED_03	7/21/2016	FS	1	1	1	
L1623549	SED	W-17-Intertidal	W-17-INTERTIDAL_072616_SED_03	7/26/2016	FS			1	2
1607903	SED	W-17-Intertidal	W-17-INTERTIDAL_072616_SED_03	7/26/2016	FS	1	1	1	
L1623546	SED	W-17-Low	W-17-LOW_072616_SED_03_DUP	7/26/2016	FD			1	2
L1623549	SED	W-17-Low	W-17-LOW_072616_SED_03	7/26/2016	FS			1	2
1607903	SED	W-17-Low	W-17-LOW_072616_SED_03	7/26/2016	FS	1	1	1	
1607903	SED	W-17-Low	W-17-LOW_072616_SED_03_DUP	7/26/2016	FD	1	1	1	
L1623549	SED	W-17-Mid	W-17-MID_072116_SED_03	7/21/2016	FS			1	2
1607903	SED	W-17-Mid	W-17-MID_072116_SED_03	7/21/2016	FS	1	1	1	
L1623546	SED	W17-N	W17-N_072116_SED_03	7/21/2016	FS			1	2
1607903	SED	W17-N	W17-N_072116_SED_03	7/21/2016	FS	1	1	1	
L1623549	SED	W-21-High	W-21-HIGH_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-21-High	W-21-HIGH_072516_SED_03	7/25/2016	FS	1	1	1	
L1623549	SED	W-21-Intertidal	W-21-INTERTIDAL_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-21-Intertidal	W-21-INTERTIDAL_072516_SED_03	7/25/2016	FS	1	1	1	
L1623549	SED	W-21-Low	W-21-LOW_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-21-Low	W-21-LOW_072516_SED_03	7/25/2016	FS	1	1	1	
L1623549	SED	W-21-Mid	W-21-MID_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-21-Mid	W-21-MID_072516_SED_03	7/25/2016	FS	1	1	1	
L1623549	SED	W-21-UM-Central-C	W-21UM-CENTRAL-C_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	W-21-UM-Central-C	W-21UM-CENTRAL-C_072716_SED_03	7/27/2016	FS	1	1	1	
L1623549	SED	W-21-UM-East-C	W-21UM-EAST-C_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-21-UM-East-C	W-21UM-EAST-C_072516_SED_03	7/25/2016	FS	1	1	1	
L1623549	SED	W-21-UM-South	W-21UM-SOUTH_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	W-21-UM-South	W-21UM-SOUTH_072716_SED_03	7/27/2016	FS	1	1	1	
L1623549	SED	W-21-UM-West-A	W-21UM-WEST-A_07/27/16_SED_03	7/27/2016	FS			1	2
1607903	SED	W-21-UM-West-A	W-21UM-WEST-A_07/27/16_SED_03	7/27/2016	FS	1	1	1	
L1623546	SED	W-61-Intertidal	W-61-HIGH_072716_SED_03	7/27/2016	FS			1	2
1607903	SED	W-61-Intertidal	W-61-HIGH_072716_SED_03	7/27/2016	FS			1	
L1623546	SED	W-61-Intertidal	W-61-INTERTIDAL-072716_SED_03	7/27/2016	FS			1	2

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

					Method Class	Methyl Mercury	Mercury	Percent Solids	TOC
					Analysis Method	EPA 1630	EPA 1631	2540G	Lloyd_Kahn
					Fraction	Total	Total	Total	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**				
L1623546	SED	W-61-Intertidal	W-61-LOW_072716_SED_03	7/27/2016	FS			1	2
L1623546	SED	W-61-Intertidal	W-61-MID_072716_SED_03	7/27/2016	FS			1	2
L1623546	SED	W-63-Intertidal	W-63-HIGH_072116_SED_03	7/21/2016	FS			1	2
L1623546	SED	W-63-Intertidal	W-63-HIGH_072116_SED_03_DUP	7/21/2016	FD			1	2
L1623546	SED	W-63-Intertidal	W-63-INTERTIDAL_072616_SED_03	7/26/2016	FS			1	2
L1623546	SED	W-63-Intertidal	W-63-LOW_072616_SED_03	7/26/2016	FS			1	2
L1623546	SED	W-63-Intertidal	W-63-MID_072616_SED_03	7/26/2016	FS			1	2
L1623546	SED	W-65-High	W-65-HIGH_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-65-High	W-65-HIGH_072516_SED_03	7/25/2016	FS	1	1	1	
L1623546	SED	W-65-Intertidal	W-65-INTERTIDAL_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-65-Intertidal	W-65-INTERTIDAL_072516_SED_03	7/25/2016	FS	1	1	1	
L1623546	SED	W-65-Low	W-65-LOW_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-65-Low	W-65-LOW_072516_SED_03	7/25/2016	FS	1	1	1	
L1623546	SED	W-65-Mid	W-65-MID_072516_SED_03	7/25/2016	FS			1	2
1607903	SED	W-65-Mid	W-65-MID_072516_SED_03	7/25/2016	FS	1	1	1	
1608072	SED	BO-04	BO-04_072516_SED_03	7/25/2016	FS	1	1	1	
1608072	SED	BO-04	BO-04_072516_SED_03_DUP	7/25/2016	FD	1	1	1	

Notes:
FD = Field Duplicate
FS = Field Sample
SDG = Sample Delivery Group
SED = Sediment
TOC = Total Organic Carbon
QC = Quality Control
Count = # of analytes

TABLE 2
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, and L1623926

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qual	Validated Result	Val Qual	Val Reason Code	Result Units
1607903	EPA 1630	1607903-10	W-17-LOW_072616_SED_03	T	Methyl mercury	2.85		2.85	J	FD	NG/G
1607903	EPA 1630	1607903-39RE1	W-17-LOW_072616_SED_03_DUP	T	Methyl mercury	8.76		8.76	J	FD	NG/G
1608072	EPA 1630	1608072-01	BO-04_072516_SED_03	T	Methyl mercury	1.08		1.08	J	FD	NG/G
1608072	EPA 1630	1608072-02RE1	BO-04_072516_SED_03_DUP	T	Methyl mercury	0.626		0.626	J	FD	NG/G
1607903	EPA 1630	1607903-43RE1	BO-04-02_072616_SED_03	T	Methyl mercury	31.7		31.7	J	MS-H, MS-RPD	NG/G
1607903	EPA 1630	1607903-44RE1	BO-04-02_072616_SED_03_DUP	T	Methyl mercury	44.6		44.6	J	MS-H, MS-RPD	NG/G
L1623926	LLOYD_KAHN	L1623926-01	BO-04_072516_SED_03	T	Total Organic Carbon (Rep1)	1.24		1.24	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-02	BO-04_072516_SED_03-DUP	T	Total Organic Carbon (Rep1)	1.11		1.11	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-03	ES-04_072816_SED_03	T	Total Organic Carbon (Rep1)	3.48		3.48	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-04	E-01-01_072816_SED_03	T	Total Organic Carbon (Rep1)	5.98		5.98	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-05	E-01-03_072816_SED_03	T	Total Organic Carbon (Rep1)	3.93		3.93	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-06	E-01-04_072816_SED_03	T	Total Organic Carbon (Rep1)	3.34		3.34	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-07	ES-03_072816_SED_03	T	Total Organic Carbon (Rep1)	4.86		4.86	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-08	ES-FP_072816_SED_03	T	Total Organic Carbon (Rep1)	0.336		0.336	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-09	ES-FP_072816_SED_03-DUP	T	Total Organic Carbon (Rep1)	0.598		0.598	J	MS-H, MS-RPD	PERCENT
L1623926	LLOYD_KAHN	L1623926-11	L9-45_072816_SED_03	T	Total Organic Carbon (Rep1)	0.493		0.493	J	MS-H, MS-RPD	PERCENT
1608072	Total Solids	1608072-01	BO-04_072516_SED_03	T	Percent Solids	73.9	[1]	73.9	J	HT-G	PERCENT
1607903	Total Solids	1607903-20	W-61-HIGH_072716_SED_03	T	Percent Solids	49.2	O-04	49.2	J	HT-G	PERCENT
1607903	Total Solids	1607903-30	W-65-INTERTIDAL_072516_SED_03	T	Percent Solids	71.9	O-04	71.9	J	HT-G	PERCENT
1607903	Total Solids	1607903-31	W-65-LOW_072516_SED_03	T	Percent Solids	63.7	O-04	63.7	J	HT-G	PERCENT
1607903	Total Solids	1607903-32	W-65-MID_072516_SED_03	T	Percent Solids	18	O-04	18	J	HT-G	PERCENT
1607903	Total Solids	1607903-33	ES-15_072716_SED_03	T	Percent Solids	62.6	O-04	62.6	J	HT-G	PERCENT
1607903	Total Solids	1607903-34	SVE-01_072716_SED_03	T	Percent Solids	51.1	O-04	51.1	J	HT-G	PERCENT
1607903	Total Solids	1607903-35	OL-01_072716_SED_03	T	Percent Solids	67.9	O-04	67.9	J	HT-G	PERCENT
1607903	Total Solids	1607903-36	W17-N_072116_SED_03	T	Percent Solids	21	O-04	21	J	HT-G	PERCENT
1607903	Total Solids	1607903-39	W-17-LOW_072616_SED_03_DUP	T	Percent Solids	50	O-04	50	J	HT-G	PERCENT
1607903	Total Solids	1607903-43	BO-04-02_072616_SED_03	T	Percent Solids	24.7	O-04	24.7	J	HT-G	PERCENT
1607903	Total Solids	1607903-44	BO-04-02_072616_SED_03_DUP	T	Percent Solids	20.7	O-04	20.7	J	HT-G	PERCENT
1608071	Total Solids	1608071-01	ES-04_072816_SED_03	T	Percent Solids	32.4	O-04	32.4	J	HT-G	PERCENT
1608071	Total Solids	1608071-02	E-01-01_072816_SED_03	T	Percent Solids	31.3	O-04	31.3	J	HT-G	PERCENT
1608071	Total Solids	1608071-03	E-01-03_072816_SED_03	T	Percent Solids	34.9	O-04	34.9	J	HT-G	PERCENT
1608071	Total Solids	1608071-04	E-01-04_072816_SED_03	T	Percent Solids	44.9	O-04	44.9	J	HT-G	PERCENT
1608071	Total Solids	1608071-05	ES-03_072816_SED_03	T	Percent Solids	38.2	O-04	38.2	J	HT-G	PERCENT
1608071	Total Solids	1608071-06	ES-FP_072816_SED_03	T	Percent Solids	75.6	O-04	75.6	J	HT-G	PERCENT

Units:
NG/G = nanograms per gram

Validation Reason Codes:
FD = Field duplicate limit exceeded
HT-G = Holding time for prep or analysis grossly exceeded
MS-H = MS and/or MSD recovery high
MS-RPD = MS/MSD RPD exceeded limit

Validation Qualifier:
J = value is estimated

Fraction:
T = total

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04-02		BO-04-02		BO-05		ES-02	
			Sample Name	BO-04-02_072616_SED_03		BO-04-02_072616_SED_03_DUP		BO-05_072016_SED_03		ES-02_072716_SED_03	
			Sample Date	7/26/2016		7/26/2016		7/20/2016		7/27/2016	
			Sample Type	FS		FD		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	31.7	J	44.6	J	7.86		22.2	
EPA 1631	Total	Mercury	NG/G	843		963		1420		849	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	24.7	J	20.7	J	24.1		37.1	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-13		ES-15		OB-05		OL-1	
			Sample Name	ES-13_072716_SED_03		ES-15_072716_SED_03		OB-05_072616_SED_03		OL-01_072716_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/26/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	16.8		2.72		11.3		6.81	
EPA 1631	Total	Mercury	NG/G	395		145		550		262	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	52.8		62.6	J	43.2		67.9	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	OV-01		OV-02		OV-04		SVE-01	
			Sample Name	OV-01_072216_SED_03		OV-02_072216_SED_03		OV-04_072216_SED_03		SVE-01_072716_SED_03	
			Sample Date	7/22/2016		7/22/2016		7/22/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	0.02	J	3.68		0.018	U	18.3	
EPA 1631	Total	Mercury	NG/G	29.3		46.5		31.1		499	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	92.1		31.1		79.3		51.1	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-High		W-17-Intertidal		W-17-Low	
			Sample Name	W-17-HIGH_072116_SED_03		W-17-INTERTIDAL_072616_SED_03		W-17-LOW_072616_SED_03	
			Sample Date	7/21/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	22.2		2.2		2.85	J
EPA 1631	Total	Mercury	NG/G	962		374		364	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	29.9		58.7		51.1	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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FS = Field Sample

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-Low		W-17-Mid		W-21-High	
			Sample Name	W-17-LOW_072616_SED_03_DUP		W-17-MID_072116_SED_03		W-21-HIGH_072516_SED_03	
			Sample Date	7/26/2016		7/21/2016		7/25/2016	
			Sample Type	FD		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		Units	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	8.76	J	3.01		15.8	
EPA 1631	Total	Mercury	NG/G	336		699		871	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	50	J	40.4		30.2	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-Intertidal		W-21-Low		W-21-Mid	
			Sample Name	W-21-INTERTIDAL_072516_SED_03		W-21-LOW_072516_SED_03		W-21-MID_072516_SED_03	
			Sample Date	7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	2.36		2.68		2.77	
EPA 1631	Total	Mercury	NG/G	467		729		813	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	41.5		40.8		34.4	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-Central-C		W-21-UM-East-C		W-21-UM-South	
			Sample Name	W-21UM-CENTRAL-C_072716_SED_03		W-21UM-EAST-C_072516_SED_03		W-21UM-SOUTH_072716_SED_03	
			Sample Date	7/27/2016		7/25/2016		7/27/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	7.02		1.28		3.47	
EPA 1631	Total	Mercury	NG/G	552		685		318	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	22.1		32.7		28.7	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-West-A		W-61-Intertidal		W-65-High	
			Sample Name	W-21UM-WEST-A_07/27/16_SED_03		W-61-HIGH_072716_SED_03		W-65-HIGH_072516_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	0.713				0.068	U
EPA 1631	Total	Mercury	NG/G	437				91.5	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	14.9		49.2	J	19	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-65-Intertidal		W-65-Low		W-65-Mid	
			Sample Name	W-65-INTERTIDAL_072516_SED_03		W-65-LOW_072516_SED_03		W-65-MID_072516_SED_03	
			Sample Date	7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	0.207		0.02	U	5.27	
EPA 1631	Total	Mercury	NG/G	42.2		16.7		267	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	71.9	J	63.7	J	18	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W17-N		E-01-01		E-01-03		E-01-04	
			Sample Name	W17-N_072116_SED_03		E-01-01_072816_SED_03		E-01-03_072816_SED_03		E-01-04_072816_SED_03	
			Sample Date	7/21/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	50.7		12.3		6.72		9.38	
EPA 1631	Total	Mercury	NG/G	358		1100		513		579	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	21	J	31.3	J	34.9	J	44.9	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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U = Analyte not detected above the reporting limit

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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-03		ES-04		ES-FP		ES-FP	
			Sample Name	ES-03_072816_SED_03		ES-04_072816_SED_03		ES-FP_072816_SED_03		ES-FP_072816_SED_03_DUP	
			Sample Date	7/28/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FD	
			Sample Delivery Group	1608071		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	3.74		1.58		1.5		0.936	
EPA 1631	Total	Mercury	NG/G	1090		297		43		37.8	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	38.2	J	32.4	J	75.6	J	74.5	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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U = Analyte not detected above the reporting limit

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	L9-45		QC		QC		QC	
			Sample Name	L9-45_072816_SED_03		Spoon_072916_SED_QC		Shovel_072916_SED_QC		Ponar_072916_SED_QC	
			Sample Date	7/28/2016		7/29/2016		7/29/2016		7/29/2016	
			Sample Type	FS		EB		EB		EB	
			Sample Delivery Group	1608071		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	0.669							
EPA 1631	Total	Mercury	NG/G	87.1							
EPA 1631	Total	Mercury	NG/L			0.16	J	0.58		2.2	
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	76.2							

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04		BO-04		BO-04-02		BO-04-02	
			Sample Name	BO-04_072516_SED_03		BO-04_072516_SED_03_DUP		BO-04-02_072616_SED_03		BO-04-02_072616_SED_03_DUP	
			Sample Date	7/25/2016		7/25/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FD		FS		FD	
			Sample Delivery Group	1608072		1608072		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	1.08	J	0.626	J				
EPA 1631	Total	Mercury	NG/G	117		79.1					
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT					23.7		23.4	
LLOYD_KAHN	Total	CARBON	PERCENT					7.77		9.12	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT					7.18		8.9	
Solids	Total	Percent Solids	PERCENT	73.9	J						
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-15		OL-1		SVE-01		W-17-Low	
			Sample Name	ES-15_072716_SED_03		OL-01_072716_SED_03		SVE-01_072716_SED_03		W-17-LOW_072616_SED_03_DUP	
			Sample Date	7/27/2016		7/27/2016		7/27/2016		7/26/2016	
			Sample Type	FS		FS		FS		FD	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	45.9		56		50		49	
LLOYD_KAHN	Total	CARBON	PERCENT	3.3		1.54		2.59		2.1	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.6		2.04		2.52		2.2	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-61-Intertidal		W-61-Intertidal		W-61-Intertidal		W-61-Intertidal	
			Sample Name	W-61-HIGH_072716_SED_03		W-61-MID_072716_SED_03		W-61-LOW_072716_SED_03		W-61-INTERTIDAL-072716_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/27/2016		7/27/2016	
			Sample Type	FS		FD		FD		FD	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	67.8		65.6		58.7		47.6	
LLOYD_KAHN	Total	CARBON	PERCENT	2.22		1.41		1.99		3.28	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.46		1.5		1.98		3.49	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-63-High		W-63-High		W-63-Intertidal		W-63-Low	
			Sample Name	W-63-HIGH_072116_SED_03		W-63-HIGH_072116_SED_03_DUP		W-63-INTERTIDAL_072616_SED_03		W-63-LOW_072616_SED_03	
			Sample Date	7/21/2016		7/21/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FD		FD		FD	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	63.9		69.7		25.5		28.8	
LLOYD_KAHN	Total	CARBON	PERCENT	2.17		1.64		7.29		6.53	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	1.96		1.37		7.54		6.53	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-63-Mid		W-65-High		W-65-Intertidal		W-65-Low	
			Sample Name	W-63-MID_072616_SED_03		W-65-HIGH_072516_SED_03		W-65-INTERTIDAL_072516_SED_03		W-65-LOW_072516_SED_03	
			Sample Date	7/26/2016		7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FD		FS		FS		FS	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	55.8		15.1		72.6		63.7	
LLOYD_KAHN	Total	CARBON	PERCENT	2.42		15.1		0.514		2.4	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.17		15.5		0.402		2.41	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-65-Mid		W17-N		BO-05		ES-02	
			Sample Name	W-65-MID_072516_SED_03		W17-N_072116_SED_03		BO-05_072016_SED_03		ES-02_072716_SED_03	
			Sample Date	7/25/2016		7/21/2016		7/20/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623546		L1623546		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	16.2		20.1		20.6		33.7	
LLOYD_KAHN	Total	CARBON	PERCENT	26.1		15.9		9.36		7.41	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	25.9		15.3		9.15		7.32	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-13		OB-05		OV-01		OV-02	
			Sample Name	ES-13_072716_SED_03		OB-05_072616_SED_03		OV-01_072216_SED_03		OV-02_072216_SED_03	
			Sample Date	7/27/2016		7/26/2016		7/22/2016		7/22/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	48.8		35.4		89.2		40.2	
LLOYD_KAHN	Total	CARBON	PERCENT	3.18		5.75		0.398		4.14	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.74		5.74		0.336		4.6	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	OV-04		W-17-High		W-17-Intertidal		W-17-Low	
			Sample Name	OV-04_072216_SED_03		W-17-HIGH_072116_SED_03		W-17-INTERTIDAL_072616_SED_03		W-17-LOW_072616_SED_03	
			Sample Date	7/22/2016		7/21/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	77.4		31.2		62.2		47.4	
LLOYD_KAHN	Total	CARBON	PERCENT	0.444		8.34		1.6		2.55	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	0.432		8.69		1.71		2.58	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-Mid		W-21-High		W-21-Intertidal		W-21-Low	
			Sample Name	W-17-MID_072116_SED_03		W-21-HIGH_072516_SED_03		W-21-INTERTIDAL_072516_SED_03		W-21-LOW_072516_SED_03	
			Sample Date	7/21/2016		7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	46.4		26.8		42.2		45.5	
LLOYD_KAHN	Total	CARBON	PERCENT	4.71		7.81		5.23		6.68	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	5.01		7.91		5.02		7.52	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-Mid		W-21-UM-Central-C		W-21-UM-East-C	
			Sample Name	W-21-MID_072516_SED_03		W-21UM-CENTRAL-C_072716_SED_03		W-21UM-EAST-C_072516_SED_03	
			Sample Date	7/25/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	39.4		20.5		32.2	
LLOYD_KAHN	Total	CARBON	PERCENT	5.84		13.8		5.75	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	5.71		13.1		5.8	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-South		W-21-UM-West-A		BO-04	
			Sample Name	W-21UM-SOUTH_072716_SED_03		W-21UM-WEST-A_07/27/16_SED_03		BO-04_072516_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	24.9		14.4		76.7	
LLOYD_KAHN	Total	CARBON	PERCENT	10.8		11.1		1.24	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	11		11.6		1.28	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04		E-01-01		E-01-03	
			Sample Name	BO-04_072516_SED_03-DUP		E-01-01_072816_SED_03		E-01-03_072816_SED_03	
			Sample Date	7/25/2016		7/28/2016		7/28/2016	
			Sample Type	FD		FS		FS	
			Sample Delivery Group	L1623926		L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	75.3		31.7		33.9	
LLOYD_KAHN	Total	CARBON	PERCENT	1.11	J	5.98	J	3.93	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	1.16		5.88		3.88	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	E-01-04		ES-03		ES-04		ES-FP	
			Sample Name	E-01-04_072816_SED_03		ES-03_072816_SED_03		ES-04_072816_SED_03		ES-FP_072816_SED_03	
			Sample Date	7/28/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623926		L1623926		L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	45		38.2		31		79.6	
LLOYD_KAHN	Total	CARBON	PERCENT	3.34	J	4.86	J	3.48	J	0.336	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	3.16		4.83		3.23		0.381	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-FP		L9-45	
			Sample Name	ES-FP_072816_SED_03-DUP		L9-45_072816_SED_03	
			Sample Date	7/28/2016		7/28/2016	
			Sample Type	FD		FS	
			Sample Delivery Group	L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT				
EPA 1630	Total	Methyl mercury	NG/G				
EPA 1631	Total	Mercury	NG/G				
EPA 1631	Total	Mercury	NG/L				
2540G	Total	Percent Solids, Residual	PERCENT	83.4		65.3	
LLOYD_KAHN	Total	CARBON	PERCENT	0.598	J	0.493	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	0.553		0.585	
Solids	Total	Percent Solids	PERCENT				
Total Solids	Total	Percent Solids	PERCENT				

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04-02		BO-04-02		BO-05		ES-02	
			Sample Name	BO-04-02_072616_SED_03		BO-04-02_072616_SED_03_DUP		BO-05_072016_SED_03		ES-02_072716_SED_03	
			Sample Date	7/26/2016		7/26/2016		7/20/2016		7/27/2016	
			Sample Type	FS		FD		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	31.7	J	44.6	J	7.86		22.2	
EPA 1631	Total	Mercury	NG/G	843		963		1420		849	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	24.7	J	20.7	J	24.1		37.1	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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Sediment_July 2016_Table 3.xls

Created by: BCG 12/21/16
Checked by: WDC 1/4/17

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-13		ES-15		OB-05		OL-1	
			Sample Name	ES-13_072716_SED_03		ES-15_072716_SED_03		OB-05_072616_SED_03		OL-01_072716_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/26/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	16.8		2.72		11.3		6.81	
EPA 1631	Total	Mercury	NG/G	395		145		550		262	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	52.8		62.6	J	43.2		67.9	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	OV-01		OV-02		OV-04		SVE-01	
			Sample Name	OV-01_072216_SED_03		OV-02_072216_SED_03		OV-04_072216_SED_03		SVE-01_072716_SED_03	
			Sample Date	7/22/2016		7/22/2016		7/22/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	0.02	J	3.68		0.018	U	18.3	
EPA 1631	Total	Mercury	NG/G	29.3		46.5		31.1		499	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	92.1		31.1		79.3		51.1	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-High		W-17-Intertidal		W-17-Low	
			Sample Name	W-17-HIGH_072116_SED_03		W-17-INTERTIDAL_072616_SED_03		W-17-LOW_072616_SED_03	
			Sample Date	7/21/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	22.2		2.2		2.85	J
EPA 1631	Total	Mercury	NG/G	962		374		364	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	29.9		58.7		51.1	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-Low		W-17-Mid		W-21-High	
			Sample Name	W-17-LOW_072616_SED_03_DUP		W-17-MID_072116_SED_03		W-21-HIGH_072516_SED_03	
			Sample Date	7/26/2016		7/21/2016		7/25/2016	
			Sample Type	FD		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	8.76	J	3.01		15.8	
EPA 1631	Total	Mercury	NG/G	336		699		871	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	50	J	40.4		30.2	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-Intertidal		W-21-Low		W-21-Mid	
			Sample Name	W-21-INTERTIDAL_072516_SED_03		W-21-LOW_072516_SED_03		W-21-MID_072516_SED_03	
			Sample Date	7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	2.36		2.68		2.77	
EPA 1631	Total	Mercury	NG/G	467		729		813	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	41.5		40.8		34.4	

Units:
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NG/L = nanograms per liter

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PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-Central-C		W-21-UM-East-C		W-21-UM-South	
			Sample Name	W-21UM-CENTRAL-C_072716_SED_03		W-21UM-EAST-C_072516_SED_03		W-21UM-SOUTH_072716_SED_03	
			Sample Date	7/27/2016		7/25/2016		7/27/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	7.02		1.28		3.47	
EPA 1631	Total	Mercury	NG/G	552		685		318	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	22.1		32.7		28.7	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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Sediment_July 2016_Table 3.xls

Created by: BCG 12/21/16
Checked by: WDC 1/4/17

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PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-West-A		W-61-Intertidal		W-65-High	
			Sample Name	W-21UM-WEST-A_07/27/16_SED_03		W-61-HIGH_072716_SED_03		W-65-HIGH_072516_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	0.713				0.068	U
EPA 1631	Total	Mercury	NG/G	437				91.5	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	14.9		49.2	J	19	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-65-Intertidal		W-65-Low		W-65-Mid	
			Sample Name	W-65-INTERTIDAL_072516_SED_03		W-65-LOW_072516_SED_03		W-65-MID_072516_SED_03	
			Sample Date	7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	1607903		1607903		1607903	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G	0.207		0.02	U	5.27	
EPA 1631	Total	Mercury	NG/G	42.2		16.7		267	
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT						
LLOYD_KAHN	Total	CARBON	PERCENT						
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT						
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT	71.9	J	63.7	J	18	J

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W17-N		E-01-01		E-01-03		E-01-04	
			Sample Name	W17-N_072116_SED_03		E-01-01_072816_SED_03		E-01-03_072816_SED_03		E-01-04_072816_SED_03	
			Sample Date	7/21/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1607903		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	50.7		12.3		6.72		9.38	
EPA 1631	Total	Mercury	NG/G	358		1100		513		579	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	21	J	31.3	J	34.9	J	44.9	J

Units:
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NG/L = nanograms per liter

Sample Type
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JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-03		ES-04		ES-FP		ES-FP	
			Sample Name	ES-03_072816_SED_03		ES-04_072816_SED_03		ES-FP_072816_SED_03		ES-FP_072816_SED_03_DUP	
			Sample Date	7/28/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FD	
			Sample Delivery Group	1608071		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	3.74		1.58		1.5		0.936	
EPA 1631	Total	Mercury	NG/G	1090		297		43		37.8	
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	38.2	J	32.4	J	75.6	J	74.5	

Units:
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NG/L = nanograms per liter

Sample Type
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PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	L9-45		QC		QC		QC	
			Sample Name	L9-45_072816_SED_03		Spoon_072916_SED_QC		Shovel_072916_SED_QC		Ponar_072916_SED_QC	
			Sample Date	7/28/2016		7/29/2016		7/29/2016		7/29/2016	
			Sample Type	FS		EB		EB		EB	
			Sample Delivery Group	1608071		1608071		1608071		1608071	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	0.669							
EPA 1631	Total	Mercury	NG/G	87.1							
EPA 1631	Total	Mercury	NG/L			0.16	J	0.58		2.2	
2540G	Total	Percent Solids, Residual	PERCENT								
LLOYD_KAHN	Total	CARBON	PERCENT								
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT								
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT	76.2							

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
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PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04		BO-04		BO-04-02		BO-04-02	
			Sample Name	BO-04_072516_SED_03		BO-04_072516_SED_03_DUP		BO-04-02_072616_SED_03		BO-04-02_072616_SED_03_DUP	
			Sample Date	7/25/2016		7/25/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FD		FS		FD	
			Sample Delivery Group	1608072		1608072		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G	1.08	J	0.626	J				
EPA 1631	Total	Mercury	NG/G	117		79.1					
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT					23.7		23.4	
LLOYD_KAHN	Total	CARBON	PERCENT					7.77		9.12	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT					7.18		8.9	
Solids	Total	Percent Solids	PERCENT	73.9	J						
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

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PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-15		OL-1		SVE-01		W-17-Low	
			Sample Name	ES-15_072716_SED_03		OL-01_072716_SED_03		SVE-01_072716_SED_03		W-17-LOW_072616_SED_03_DUP	
			Sample Date	7/27/2016		7/27/2016		7/27/2016		7/26/2016	
			Sample Type	FS		FS		FS		FD	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	45.9		56		50		49	
LLOYD_KAHN	Total	CARBON	PERCENT	3.3		1.54		2.59		2.1	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.6		2.04		2.52		2.2	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
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PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-61-Intertidal		W-61-Intertidal		W-61-Intertidal		W-61-Intertidal	
			Sample Name	W-61-HIGH_072716_SED_03		W-61-MID_072716_SED_03		W-61-LOW_072716_SED_03		W-61-INTERTIDAL-072716_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/27/2016		7/27/2016	
			Sample Type	FS		FD		FD		FD	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	67.8		65.6		58.7		47.6	
LLOYD_KAHN	Total	CARBON	PERCENT	2.22		1.41		1.99		3.28	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.46		1.5		1.98		3.49	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-63-High		W-63-High		W-63-Intertidal		W-63-Low
			Sample Name	W-63-HIGH_072116_SED_03		W-63-HIGH_072116_SED_03_DUP		W-63-INTERTIDAL_072616_SED_03		W-63-LOW_072616_
			Sample Date	7/21/2016		7/21/2016		7/26/2016		7/26/2016
			Sample Type	FS		FD		FD		FD
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result
Solids	Total	Percent Solids	% BY WEIGHT							
EPA 1630	Total	Methyl mercury	NG/G							
EPA 1631	Total	Mercury	NG/G							
EPA 1631	Total	Mercury	NG/L							
2540G	Total	Percent Solids, Residual	PERCENT	63.9		69.7		25.5		28.8
LLOYD_KAHN	Total	CARBON	PERCENT	2.17		1.64		7.29		6.53
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	1.96		1.37		7.54		6.53
Solids	Total	Percent Solids	PERCENT							
Total Solids	Total	Percent Solids	PERCENT							

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	
			Sample Name	_SED_03
			Sample Date	
			Sample Type	
			Sample Delivery Group	
	Fraction		**Units**	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT	
EPA 1630	Total	Methyl mercury	NG/G	
EPA 1631	Total	Mercury	NG/G	
EPA 1631	Total	Mercury	NG/L	
2540G	Total	Percent Solids, Residual	PERCENT	
LLOYD_KAHN	Total	CARBON	PERCENT	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	
Solids	Total	Percent Solids	PERCENT	
Total Solids	Total	Percent Solids	PERCENT	

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-63-Mid		W-65-High		W-65-Intertidal		W-65-Low	
			Sample Name	W-63-MID_072616_SED_03		W-65-HIGH_072516_SED_03		W-65-INTERTIDAL_072516_SED_03		W-65-LOW_072516_SED_03	
			Sample Date	7/26/2016		7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FD		FS		FS		FS	
			Sample Delivery Group	L1623546		L1623546		L1623546		L1623546	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	55.8		15.1		72.6		63.7	
LLOYD_KAHN	Total	CARBON	PERCENT	2.42		15.1		0.514		2.4	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.17		15.5		0.402		2.41	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-65-Mid		W17-N		BO-05		ES-02	
			Sample Name	W-65-MID_072516_SED_03		W17-N_072116_SED_03		BO-05_072016_SED_03		ES-02_072716_SED_03	
			Sample Date	7/25/2016		7/21/2016		7/20/2016		7/27/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623546		L1623546		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	16.2		20.1		20.6		33.7	
LLOYD_KAHN	Total	CARBON	PERCENT	26.1		15.9		9.36		7.41	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	25.9		15.3		9.15		7.32	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-13		OB-05		OV-01		OV-02	
			Sample Name	ES-13_072716_SED_03		OB-05_072616_SED_03		OV-01_072216_SED_03		OV-02_072216_SED_03	
			Sample Date	7/27/2016		7/26/2016		7/22/2016		7/22/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	48.8		35.4		89.2		40.2	
LLOYD_KAHN	Total	CARBON	PERCENT	3.18		5.75		0.398		4.14	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.74		5.74		0.336		4.6	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	OV-04		W-17-High		W-17-Intertidal		W-17-Low	
			Sample Name	OV-04_072216_SED_03		W-17-HIGH_072116_SED_03		W-17-INTERTIDAL_072616_SED_03		W-17-LOW_072616_SED_03	
			Sample Date	7/22/2016		7/21/2016		7/26/2016		7/26/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	77.4		31.2		62.2		47.4	
LLOYD_KAHN	Total	CARBON	PERCENT	0.444		8.34		1.6		2.55	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	0.432		8.69		1.71		2.58	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-17-Mid		W-21-High		W-21-Intertidal		W-21-Low	
			Sample Name	W-17-MID_072116_SED_03		W-21-HIGH_072516_SED_03		W-21-INTERTIDAL_072516_SED_03		W-21-LOW_072516_SED_03	
			Sample Date	7/21/2016		7/25/2016		7/25/2016		7/25/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	46.4		26.8		42.2		45.5	
LLOYD_KAHN	Total	CARBON	PERCENT	4.71		7.81		5.23		6.68	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	5.01		7.91		5.02		7.52	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-Mid		W-21-UM-Central-C		W-21-UM-East-C	
			Sample Name	W-21-MID_072516_SED_03		W-21UM-CENTRAL-C_072716_SED_03		W-21UM-EAST-C_072516_SED_03	
			Sample Date	7/25/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623549	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	39.4		20.5		32.2	
LLOYD_KAHN	Total	CARBON	PERCENT	5.84		13.8		5.75	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	5.71		13.1		5.8	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	W-21-UM-South		W-21-UM-West-A		BO-04	
			Sample Name	W-21UM-SOUTH_072716_SED_03		W-21UM-WEST-A_07/27/16_SED_03		BO-04_072516_SED_03	
			Sample Date	7/27/2016		7/27/2016		7/25/2016	
			Sample Type	FS		FS		FS	
			Sample Delivery Group	L1623549		L1623549		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	24.9		14.4		76.7	
LLOYD_KAHN	Total	CARBON	PERCENT	10.8		11.1		1.24	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	11		11.6		1.28	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	BO-04		E-01-01		E-01-03	
			Sample Name	BO-04_072516_SED_03-DUP		E-01-01_072816_SED_03		E-01-03_072816_SED_03	
			Sample Date	7/25/2016		7/28/2016		7/28/2016	
			Sample Type	FD		FS		FS	
			Sample Delivery Group	L1623926		L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT						
EPA 1630	Total	Methyl mercury	NG/G						
EPA 1631	Total	Mercury	NG/G						
EPA 1631	Total	Mercury	NG/L						
2540G	Total	Percent Solids, Residual	PERCENT	75.3		31.7		33.9	
LLOYD_KAHN	Total	CARBON	PERCENT	1.11	J	5.98	J	3.93	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	1.16		5.88		3.88	
Solids	Total	Percent Solids	PERCENT						
Total Solids	Total	Percent Solids	PERCENT						

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	E-01-04		ES-03		ES-04		ES-FP	
			Sample Name	E-01-04_072816_SED_03		ES-03_072816_SED_03		ES-04_072816_SED_03		ES-FP_072816_SED_03	
			Sample Date	7/28/2016		7/28/2016		7/28/2016		7/28/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	L1623926		L1623926		L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT								
EPA 1630	Total	Methyl mercury	NG/G								
EPA 1631	Total	Mercury	NG/G								
EPA 1631	Total	Mercury	NG/L								
2540G	Total	Percent Solids, Residual	PERCENT	45		38.2		31		79.6	
LLOYD_KAHN	Total	CARBON	PERCENT	3.34	J	4.86	J	3.48	J	0.336	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	3.16		4.83		3.23		0.381	
Solids	Total	Percent Solids	PERCENT								
Total Solids	Total	Percent Solids	PERCENT								

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
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TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607903, 1608071, 1608072, L1623546, L1623549, L1623926

			Location ID	ES-FP		L9-45	
			Sample Name	ES-FP_072816_SED_03-DUP		L9-45_072816_SED_03	
			Sample Date	7/28/2016		7/28/2016	
			Sample Type	FD		FS	
			Sample Delivery Group	L1623926		L1623926	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier
Solids	Total	Percent Solids	% BY WEIGHT				
EPA 1630	Total	Methyl mercury	NG/G				
EPA 1631	Total	Mercury	NG/G				
EPA 1631	Total	Mercury	NG/L				
2540G	Total	Percent Solids, Residual	PERCENT	83.4		65.3	
LLOYD_KAHN	Total	CARBON	PERCENT	0.598	J	0.493	J
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	0.553		0.585	
Solids	Total	Percent Solids	PERCENT				
Total Solids	Total	Percent Solids	PERCENT				

Units:
NG/G = nanograms per gram
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Data Validation Summary
November 2016 Sediment Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Sediment samples were collected in November 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery group (SDG) 1611323. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and were included in SDG L1636491. Samples were analyzed by one or more of the following: Clean Water Act (CWA, 2012) or Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Total Organic Carbon (TOC)	Lloyd Kahn	10% Stage III/ 90% Stage IIB
Alpha	Percent Solids (TS)	SM 2540G	10% Stage III/ 90% Stage IIB

A Stage IIB data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

HT-G = Holding time for prep or analysis grossly exceeded
LD = Laboratory duplicate limit exceeded

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

*	Data Completeness and Chain of Custody
	Holding Times and Preservation
*	Blanks
*	Initial Calibration
*	Continuing Calibration
*	Laboratory Control Sample (LCS)
*	Matrix Spike/Matrix Spike Duplicates (MS/MSD)
	Laboratory Duplicates
*	Field Duplicates
*	Detection Limits
*	Sample Result Verification/Electronic Evaluation Verification (EDD)
*	Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

Results were determined to be usable as reported by the laboratory.

3.0 Mercury – 1631

Results were determined to be usable as reported by the laboratory.

4.0 Total Organic Carbon – Lloyd Kahn

Laboratory Duplicates

L1636491 – A sample replicate performed on sample W-63-HIGH_110816_SED_03 had a relative percent difference (RPD) greater than 30 percent. Reanalysis was performed and results were confirmed. The original analysis was reported and the RPD was attributed to non-homogeneity of the native sample. The results for sample W-63-HIGH_110816_SED_03 have been qualified estimated (J) with reason code LD.

5.0 Percent Solids – 2540G

Holding Times and Preservation

1611323 – Each sample was analyzed 24 days beyond technical holding time. Based on professional judgment, percent solids results were qualified estimated (J) with reason code HT-G.

References:

Amec Foster Wheeler, 2016. “Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan”, Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA”; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use”; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review”; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures”; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Julie Pallozzi December 30, 2016

Julie Pallozzi

Senior Reviewer: Denise King January 05, 2017

Denise King

TABLE 1
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

					Method Class	Methyl Mercury	Mercury	Solids	Organic Carbon
					Analysis Method	EPA 1630	EPA 1631	2540G	Lloyd Khan
					Fraction	Total	Total	Total	Total
SDG	**Location**	**Field Sample ID**	**Sample Date**	**Media**	**QC Code**	Count	Count	Count	Count
1611323	W-61-High	W-61-HIGH_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-61-Intertidal	W-61-INT_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-61-Low	W-61-LOW_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-61-Mid	W-61-MID_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-63-High	W-63-HIGH_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-63-Intertidal	W-63-INT_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-63-Low	W-63-LOW_110816_SED_03	11/8/2016	SED	FS	1	1	1	
1611323	W-63-Mid	W-63-MID_110816_SED_03	11/8/2016	SED	FS	1	1	1	
L1636491	W-61-High	W-61-HIGH_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-61-Intertidal	W-61-INT_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-61-Low	W-61-LOW_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-61-Mid	W-61-MID_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-63-High	W-63-HIGH_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-63-Intertidal	W-63-INT_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-63-Low	W-63-LOW_110816_SED_03	11/8/2016	SED	FS			1	2
L1636491	W-63-Mid	W-63-MID_110816_SED_03	11/8/2016	SED	FS			1	2

Notes:
Count = Number of analytes
FS = Field Sample
SDG = Sample Delivery group
SED = Sediment

Created by: BCG 1/4/17
Checked by: JPP 1/5/17

TABLE 2
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validated Qualifier	Validation Reason Code	Result Units
1611323	% Solids	1611323-01	W-61-HIGH_110816_SED_03	Total	Percent Solids	30.8	[1]	30.8	J	HT-G	% BY WT.
1611323	% Solids	1611323-02	W-61-INT_110816_SED_03	Total	Percent Solids	28.4	[2]	28.4	J	HT-G	% BY WT.
1611323	% Solids	1611323-03	W-61-LOW_110816_SED_03	Total	Percent Solids	35.1	[3]	35.1	J	HT-G	% BY WT.
1611323	% Solids	1611323-04	W-61-MID_110816_SED_03	Total	Percent Solids	41.7	[4]	41.7	J	HT-G	% BY WT.
1611323	% Solids	1611323-05	W-63-HIGH_110816_SED_03	Total	Percent Solids	77.7	[5]	77.7	J	HT-G	% BY WT.
1611323	% Solids	1611323-06	W-63-INT_110816_SED_03	Total	Percent Solids	29.9	[6]	29.9	J	HT-G	% BY WT.
1611323	% Solids	1611323-07	W-63-LOW_110816_SED_03	Total	Percent Solids	65.3	[7]	65.3	J	HT-G	% BY WT.
1611323	% Solids	1611323-08	W-63-MID_110816_SED_03	Total	Percent Solids	55.7	[8]	55.7	J	HT-G	% BY WT.
L1636491	LLOYD_KAHN	L1636491-05	W-63-HIGH_110816_SED_03	Total	Total Organic Carbon (1)	0.307		0.307	J	LD	PERCENT
L1636491	LLOYD_KAHN	L1636491-05	W-63-HIGH_110816_SED_03	Total	Total Organic Carbon (2)	0.508		0.508	J	LD	PERCENT

Units:
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Validation Reason Codes:
HT-G = Holding time grossly exceeded
LD = Lab duplicate limit exceeded

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Created by: BCG 1/4/17
Checked by: JPP 1/5/17

TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-61-High		W-61-Intertidal		W-61-Low	
			Sample Name	W-61-HIGH_110816_SED_03		W-61-INT_110816_SED_03		W-61-LOW_110816_SED_03	
			Sample Date	11/08/16		11/08/16		11/08/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	4.87		5.59		18.8	
EPA 1631	Total	Mercury	NG/G	318		980		773	
% Solids	Total	Percent Solids	% BY WT.	30.8	J	28.4	J	35.1	J
2540G	Total	Percent Solids, Residual	PERCENT	30.9		27.8		40.6	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	15.5		11.4		8.34	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	16.1		10.4		8.68	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

Created by: BCG 1/4/17
Checked by: JPP 1/5/17

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TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-61-Mid		W-63-High		W-63-Intertidal	
			Sample Name	W-61-MID_110816_SED_03		W-63-HIGH_110816_SED_03		W-63-INT_110816_SED_03	
			Sample Date	11/08/16		11/08/16		11/08/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	6.65		0.232		11.2	
EPA 1631	Total	Mercury	NG/G	682		37.9		1050	
% Solids	Total	Percent Solids	% BY WT.	41.7	J	77.7	J	29.9	J
2540G	Total	Percent Solids, Residual	PERCENT	39.6		29.5		29.9	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	13		0.307	J	9.94	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	11.1		0.508	J	9.68	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

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Created by: BCG 1/4/17
Checked by: JPP 1/5/17

TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-63-Low		W-63-Mid	
			Sample Name	W-63-LOW_110816_SED_03		W-63-MID_110816_SED_03	
			Sample Date	11/08/16		11/08/16	
			Sample Type	FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	2.25		6.96	
EPA 1631	Total	Mercury	NG/G	217		222	
% Solids	Total	Percent Solids	% BY WT.	65.3	J	55.7	J
2540G	Total	Percent Solids, Residual	PERCENT	50.9		59.5	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	2.29		4.88	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.74		4.39	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

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TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-61-High		W-61-Intertidal		W-61-Low	
			Sample Name	W-61-HIGH_110816_SED_03		W-61-INT_110816_SED_03		W-61-LOW_110816_SED_03	
			Sample Date	11/08/16		11/08/16		11/08/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	4.87		5.59		18.8	
EPA 1631	Total	Mercury	NG/G	318		980		773	
% Solids	Total	Percent Solids	% BY WT.	30.8	J	28.4	J	35.1	J
2540G	Total	Percent Solids, Residual	PERCENT	30.9		27.8		40.6	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	15.5		11.4		8.34	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	16.1		10.4		8.68	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

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Checked by: JPP 1/5/17

TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-61-Mid		W-63-High		W-63-Intertidal	
			Sample Name	W-61-MID_110816_SED_03		W-63-HIGH_110816_SED_03		W-63-INT_110816_SED_03	
			Sample Date	11/08/16		11/08/16		11/08/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	6.65		0.232		11.2	
EPA 1631	Total	Mercury	NG/G	682		37.9		1050	
% Solids	Total	Percent Solids	% BY WT.	41.7	J	77.7	J	29.9	J
2540G	Total	Percent Solids, Residual	PERCENT	39.6		29.5		29.9	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	13		0.307	J	9.94	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	11.1		0.508	J	9.68	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

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TABLE 3
DATA VALIDATION SUMMARY
NOVEMBER 2016 SEDIMENT SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III – ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1611323 and L1636491

			Location ID	W-63-Low		W-63-Mid	
			Sample Name	W-63-LOW_110816_SED_03		W-63-MID_110816_SED_03	
			Sample Date	11/08/16		11/08/16	
			Sample Type	FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl Mercury	NG/G	2.25		6.96	
EPA 1631	Total	Mercury	NG/G	217		222	
% Solids	Total	Percent Solids	% BY WT.	65.3	J	55.7	J
2540G	Total	Percent Solids, Residual	PERCENT	50.9		59.5	
LLOYD_KAHN	Total	Total Organic Carbon (1)	PERCENT	2.29		4.88	
LLOYD_KAHN	Total	Total Organic Carbon (2)	PERCENT	2.74		4.39	

Units:
NG/G = Nanogram per gram
% by wt. = Percent by weight

Validation Qualifier:
J = Value is estimated

Sample Type:
FS = Field Sample

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Checked by: JPP 1/5/17

APPENDIX C-2
2016 SURFACE WATER SAMPLES VALIDATION REPORTS

Data Validation Summary
May 2016 Surface Water Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in May 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery groups (SDGs) 1605775 and 1605778. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDG L1616303. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA 1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Dissolved Organic Carbon	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
  Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
* Matrix Spike/Matrix Spike Duplicates (MS/MSD)
* Laboratory Duplicates
* Field Duplicates
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

<u>Blanks</u>

SDG 1605775 – Methyl mercury was detected at a concentration of 0.039 ng/L in the method blanks associated with the analysis of samples ES-15_052616_SW_10, WQ-ECH_052616_SW_10, and WQ-FPT_052616_SW_10. An action level was established at five times the highest reported blank detection and compared to sample results. Total and dissolved methyl mercury in samples WQ-ECH_052616-SW10 and WQ-FPT_052616-SW-10 and dissolved methyl mercury in sample ES-15-052616-SW-10 were non-detect, no qualification was required. A low concentration result for total methyl mercury in sample ES-15-052616-SW-10 was less than the action level and less than the reporting limit and was qualified non-detect (U) at the reporting limit.

SDG 1605778 – Methyl mercury was detected at a concentration of 0.035 ng/L in the method blanks associated with the analysis of sample WQ2-C_052716_SW_10. An action level was established at five times the concentration reported in the blank and compared to sample results. The total methyl mercury concentration in sample WQ2-C_052716_SW_10 (0.423 ng/L) was greater than the action level; no qualification was required. A low concentration result for dissolved methyl mercury in sample WQ2-C-052716-SW-10 was less than the action level and less than the reporting limit and was qualified non-detect (U) at the reporting limit.

3.0 Mercury – 1631

Blanks

SDG 1605775 – Mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.21 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Total and dissolved results for samples OV02_052616_SW_10, WQ1B_C_052616_SW_10, and WQ1B_C_052616_SW_10_DUP, and the total mercury results for samples ES-15_052616_SW_10, WQ-ECH_052616_SW_10, WQ-FPT_052616_SW_10, and WQ3-L_052616_SW_10 were greater than the action level; no action was required. Dissolved mercury results in samples ES-15_052616-SW_10, WQ3-L_052616_SW_10, and WQ-ECH_052616_SW_10 were less than the action level and were qualified not detected (U). A low concentration result for dissolved mercury in sample WQ-FPT_052616_SW_10 was less than the action level and less than the reporting limit and was qualified non-detect (U) at the reporting limit.

References:

Amec Foster Wheeler, 2016. “Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan”, Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA”; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use”; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review”; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures”; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Wolfgang D. Calicchio October 19, 2016

Wolfgang D. Calicchio

Senior Reviewer: Denise King October 20, 2016

Denise King

TABLE 1
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Dissolved	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**						
1605775	SW	ES-15	ES-15_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605775	SW	OV-02	OV02_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605775	SW	WQ-ECH	WQ-ECH_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605775	SW	WQ-FPT	WQ-FPT_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605775	SW	WQ1b-C	WQ1B-C_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605775	SW	WQ1b-C	WQ1B-C_052616_SW_10_DUP	5/26/2016	FD	1	1	1	1		
1605775	SW	WQ3-L	WQ3-L_052616_SW_10	5/26/2016	FS	1	1	1	1		
1605778	SW	WQ2-C	WQ2-C_052716_SW_10	5/27/2016	FS	1	1	1	1		
L1616303	SW	ES-15	ES-15_052616_SW_10	5/26/2016	FS					1	1
L1616303	SW	OV-02	OV02_052616_SW_10	5/26/2016	FS					1	1
L1616303	SW	WQ-ECH	WQ-ECH_052616_SW_10	5/26/2016	FS					1	1
L1616303	SW	WQ-FPT	WQ-FPT_052616_SW_10	5/26/2016	FS					1	1
L1616303	SW	WQ1b-C	WQ1B-C_052616_SW_10	5/26/2016	FS					1	1
L1616303	SW	WQ1b-C	WQ1B-C_052616_SW_10_DUP	5/26/2016	FD					1	1
L1616303	SW	WQ2-C	WQ2-C_052716_SW_10	5/27/2016	FS					1	1
L1616303	SW	WQ3-L	WQ3-L_052616_SW_10	5/26/2016	FS					1	1

Notes:
DOC = Dissolved Organic Carbon
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
TSS = Total Suspended Solids
Count = # of analytes

Created by: BCG 8/02/16
Checked by:WDC 8/08/16

TABLE 2
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qual	Validated Result	Val Qual	Val Reason	Result Units
1605775	EPA 1631	1605775-04	ES-15_052616_SW_10	D	Mercury	0.74		0.74	U	BL1	NG/L
1605775	EPA 1630	1605775-03RE1	ES-15_052616_SW_10	T	Methyl mercury	0.037	J	0.05	U	BL1	NG/L
1605775	EPA 1631	1605775-06	WQ-ECH_052616_SW_10	D	Mercury	0.74		0.74	U	BL1	NG/L
1605775	EPA 1631	1605775-08	WQ-FPT_052616_SW_10	D	Mercury	0.49	J	0.5	U	BL1	NG/L
1605778	EPA 1630	1605778-02	WQ2-C_052716_SW_10	D	Methyl mercury	0.04	QM-12 J	0.05	U	BL1	NG/L
1605775	EPA 1631	1605775-18	WQ3-L_052616_SW_10	D	Mercury	0.73		0.73	U	BL1	NG/L

Units:
NG/L = nanograms per liter

Validation Reason Codes:
BL1 = Method blank contamination

Validation Qualifier:
J = value is estimated
U = not detected

Fraction:
D = dissolved
T = total

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Surface Water_May 2016_Table 2.xls

Created by: BCG 10/25/16
Checked by:WDC 10/25/16

TABLE 3
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

			Location ID	ES-15		OV-02		WQ-ECH		WQ-FPT	
			Sample Name	ES-15_052616_SW_10		OV02_052616_SW_10		WQ-ECH_052616_SW_10		WQ-FPT_052616_SW_10	
			Sample Date	5/26/2016		5/26/2016		5/26/2016		5/26/2016	
			Sample Type	FS		FS		FS		FS	
			Sample Delivery Group	1605775		1605775		1605775		1605775	
	Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.05	U	0.113		0.05	U	0.05	U
EPA 1631	Total	Mercury	NG/L	6.13		2.18		6.9		1.67	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.078		0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	0.74	U	1.63		0.74	U	0.5	U
2540D	Total	Total Suspended Solids	MG/L								
9060A	Dissolved	Dissolved Organic Carbon	MG/L								

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

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Surface Water_May 2016_Table 3.xls

Created by: BCG 10/25/16
Checked by:WDC 10/25/16

TABLE 3
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

		Location ID	WQ1b-C		WQ1b-C		WQ3-L		WQ2-C	
		Sample Name	WQ1B-C_052616_SW_10		WQ1B-C_052616_SW_10_DUP		WQ3-L_052616_SW_10		WQ2-C_052716_SW_10	
		Sample Date	5/26/2016		5/26/2016		5/26/2016		5/27/2016	
		Sample Type	FS		FD		FS		FS	
		Sample Delivery Group	1605775		1605775		1605775		1605778	
Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Total	Methyl mercury	NG/L	0.214		0.164		0.029	J	0.423	
Total	Mercury	NG/L	9.85		7.3		3.04		34.9	
Dissolved	Methyl mercury	NG/L	0.031	J	0.029	J	0.05	U	0.05	U
Dissolved	Mercury	NG/L	1.35		1.41		0.73	U	1.42	
Total	Total Suspended Solids	MG/L								
Dissolved	Dissolved Organic Carbon	MG/L								

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

		Location ID	ES-15		OV-02		WQ-ECH		WQ-FPT		WQ1b-C	
		Sample Name	ES-15_052616_SW_10		OV02_052616_SW_10		WQ-ECH_052616_SW_10		WQ-FPT_052616_SW_10		WQ1B-C_052616_SW_10	
		Sample Date	5/26/2016		5/26/2016		5/26/2016		5/26/2016		5/26/2016	
		Sample Type	FS		FS		FS		FS		FS	
		Sample Delivery Group	L1616303		L1616303		L1616303		L1616303		L1616303	
Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Total	Methyl mercury	NG/L										
Total	Mercury	NG/L										
Dissolved	Methyl mercury	NG/L										
Dissolved	Mercury	NG/L										
Total	Total Suspended Solids	MG/L	12		5	U	7.3		8.3		6.5	
Dissolved	Dissolved Organic Carbon	MG/L	0.46	J	6.8		0.4	J	0.28	J	4.6	

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
MAY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1605775, 1605778, L1616303

		Location ID	WQ1b-C		WQ2-C		WQ3-L	
		Sample Name	WQ1B-C_052616_SW_10_DUP		WQ2-C_052716_SW_10		WQ3-L_052616_SW_10	
		Sample Date	5/26/2016		5/27/2016		5/26/2016	
		Sample Type	FD		FS		FS	
		Sample Delivery Group	L1616303		L1616303		L1616303	
Fraction		**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
Total	Methyl mercury	NG/L						
Total	Mercury	NG/L						
Dissolved	Methyl mercury	NG/L						
Dissolved	Mercury	NG/L						
Total	Total Suspended Solids	MG/L	7.8		45		7.6	
Dissolved	Dissolved Organic Carbon	MG/L	4.8		1.2		0.4	J

Units:

MG/L = milligrams per liter

NG/L = nanograms per liter

Validation Qualifier:

J = value is estimated

U = Analyte not detected above the reporting limit

Data Validation Summary
June 2016 Surface Water Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in June 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery group (SDG) 1607042. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDG L1620423. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Dissolved Organic Carbon	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination
MS-L = MS and/or MSD recovery low

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

- * Data Completeness and Chain of Custody
- * Holding Times and Preservation
- Blanks
- * Initial Calibration
- * Continuing Calibration
- * Laboratory Control Sample (LCS)
- Matrix Spike/Matrix Spike Duplicates (MS/MSD)
- * Laboratory Duplicates
- * Field Duplicates
- * Detection Limits
- * Sample Result Verification/Electronic Evaluation Verification (EDD)
- * Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

<u>Blanks</u>

SDG 1607042 – In a subset of samples analyzed on July 13, 2016, methyl mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.044 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Dissolved methyl mercury results reported in samples OV-02_062916_SW_10 and WQ1b-c_062916_SW_10, and total methyl mercury results reported in samples OV-02_062916_SW_10 and WQ2-c_063016_SW_10 were less than the action level and were qualified non-detect (U).

In a subset of samples analyzed on July 20, 2016, methyl mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.016 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Total methyl mercury reported in samples WQ3-L_062916_SW_10, WQ-ECH_062916_SW_10, and WQ-ECH_062916_SW_10_DUP were less than the action level and were qualified non-detect (U). Low concentration results for dissolved methyl mercury in samples WQ2-c_063016_SW_10, WQ-ECH_062916_SW_10, and WQ-ECH_062916_SW_10_DUP and total methyl mercury in samples ES-15_062916_SW_10 and WQ-FPT_062916_SW_10 were less than the action level and less than the reporting limit and were qualified non-detect (U) at the reporting limit.

3.0 Mercury – 1631

Blanks

SDG 1607042 – Mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.40 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Dissolved results for samples OV-02_062916_SW_10, WQ1b-c_063016_SW_10, WQ2-c_063016_SW_10, WQ3-L_062916_SW_10, ES-15_062916_SW_10, WQ-ECH_062916_SW_10, WQ-ECH_062916_SW_10_DUP, and WQ-FPT_062916_SW_10 were less than the action level and were qualified non-detect (U). Total results for samples OV-02_062916_SW_10, ES-15_062916_SW_10, and WQ-FPT_062916_SW_10 were less than the action level and were qualified non-detect (U).

4.0 Dissolved Organic Carbon – 9060A

Matrix Spike/Matrix Spike Duplicates

SDG L1620423 – Sample WQ-ECH_062916_SW-10 was submitted for MS/MSD analysis. The laboratory did not perform the MSD analysis as specified on the chain of custody but did perform a laboratory duplicate. The MS percent recovery for DOC (26%) was less than the lower QC limit of 80%. DOC sample results were qualified estimated (J) and are potentially biased low.

5.0 Total Suspended Solids – 2540D

Results were determined to be usable as reported by the laboratory.

References:

Amec Foster Wheeler, 2016. "Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan", Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA"; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use"; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review"; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Wolfgang D. Calicchio October 26, 2016

Wolfgang D. Calicchio

Senior Reviewer: Denise King December 1, 2016

Denise King

TABLE 1
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1620423

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Dissolved	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**						
1607042	SW	ES-15	ES-15_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	ES-15	ES-15_062916_SW_10	6/29/2016	FS		1		1		
1607042	SW	OV-02	OV-02_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	OV-02	OV-02_062916_SW_10	6/29/2016	FS		1		1		
1607042	SW	QC	EB_062916_SW_QC	6/29/2016	EB		1		1		
1607042	SW	WQ-ECH	WQ-ECH_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	WQ-ECH	WQ-ECH_062916_SW_10	6/29/2016	FS		1		1		
1607042	SW	WQ-ECH	WQ-ECH_062916_SW_10_DUP	6/29/2016	FD	1		1			
1607042	SW	WQ-ECH	WQ-ECH_062916_SW_10_DUP	6/29/2016	FD		1		1		
1607042	SW	WQ-FPT	WQ-FPT_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	WQ-FPT	WQ-FPT_062916_SW_10	6/29/2016	FS		1		1		
1607042	SW	WQ1b-C	WQ1b-c_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	WQ1b-C	WQ1b-c_062916_SW_10	6/29/2016	FS		1		1		
1607042	SW	WQ2-C	WQ2-c_063016_SW_10	6/30/2016	FS	1		1			
1607042	SW	WQ2-C	WQ2-c_063016_SW_10	6/30/2016	FS		1		1		
1607042	SW	WQ3-L	WQ3-L_062916_SW_10	6/29/2016	FS	1		1			
1607042	SW	WQ3-L	WQ3-L_062916_SW_10	6/29/2016	FS		1		1		
L1620423	SW	ES-15	ES-15_062916_SW_10	6/29/2016	FS					1	1
L1620423	SW	OV-02	OV-02_062916_SW_10	6/29/2016	FS					1	1
L1620423	SW	WQ-161B-C	WQ161B-C_062916_SW_10	6/29/2016	FS					1	1
L1620423	SW	WQ-2C	WQ2-C_063016_SW_10	6/30/2016	FS					1	1
L1620423	SW	WQ-3L	WQ3-L_062916_SW_10	6/29/2016	FS					1	1
L1620423	SW	WQ-ECH	WQ-ECH_062916_SW_10	6/29/2016	FS					1	1
L1620423	SW	WQ-ECH	WQ-ECH_062916_SW_10_DUP	6/29/2016	FD					1	1
L1620423	SW	WQ-FPT	WQ-FPT_062916_SW_10	6/29/2016	FS					1	1

Notes:
DOC = Dissolved Organic Carbon
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
TSS = Total Suspended Solids
Count = # of analytes

TABLE 2
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1620423

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validation Qualifier	Validation Reason Code	Result Units
1607042	EPA 1631	1607042-02	OV-02_062916_SW_10	D	Mercury	1.19		1.19	U	BL1	NG/L
1607042	EPA 1631	1607042-04	WQ1b-c_062916_SW_10	D	Mercury	1.87		1.87	U	BL1	NG/L
1607042	EPA 1631	1607042-06	WQ2-c_063016_SW_10	D	Mercury	1.38		1.38	U	BL1	NG/L
1607042	EPA 1631	1607042-08	WQ3-L_062916_SW_10	D	Mercury	0.97		0.97	U	BL1	NG/L
1607042	EPA 1631	1607042-10	ES-15_062916_SW_10	D	Mercury	0.59		0.59	U	BL1	NG/L
1607042	EPA 1631	1607042-12	WQ-ECH_062916_SW_10	D	Mercury	1.06		1.06	U	BL1	NG/L
1607042	EPA 1631	1607042-14	WQ-FPT_062916_SW_10	D	Mercury	0.68		0.68	U	BL1	NG/L
1607042	EPA 1631	1607042-16	WQ-ECH_062916_SW_10_DUP	D	Mercury	1.18		1.18	U	BL1	NG/L
1607042	EPA 1631	1607042-01	OV-02_062916_SW_10	T	Mercury	1.82		1.82	U	BL1	NG/L
1607042	EPA 1631	1607042-09	ES-15_062916_SW_10	T	Mercury	1.87		1.87	U	BL1	NG/L
1607042	EPA 1631	1607042-13	WQ-FPT_062916_SW_10	T	Mercury	1.67		1.67	U	BL1	NG/L
1607042	EPA 1630	1607042-02	OV-02_062916_SW_10	D	Methyl mercury	0.127		0.127	U	BL1	NG/L
1607042	EPA 1630	1607042-04	WQ1b-c_062916_SW_10	D	Methyl mercury	0.066		0.066	U	BL1	NG/L
1607042	EPA 1630	1607042-06	WQ2-c_063016_SW_10	D	Methyl mercury	0.041	J	0.05	U	BL1	NG/L
1607042	EPA 1630	1607042-12	WQ-ECH_062916_SW_10	D	Methyl mercury	0.036	J	0.05	U	BL1	NG/L
1607042	EPA 1630	1607042-16	WQ-ECH_062916_SW_10_DUP	D	Methyl mercury	0.028	J	0.05	U	BL1	NG/L
1607042	EPA 1630	1607042-01	OV-02_062916_SW_10	T	Methyl mercury	0.169		0.169	U	BL1	NG/L
1607042	EPA 1630	1607042-05	WQ2-c_063016_SW_10	T	Methyl mercury	0.06		0.06	U	BL1	NG/L
1607042	EPA 1630	1607042-07	WQ3-L_062916_SW_10	T	Methyl mercury	0.058		0.058	U	BL1	NG/L
1607042	EPA 1630	1607042-09	ES-15_062916_SW_10	T	Methyl mercury	0.05	J	0.05	U	BL1	NG/L
1607042	EPA 1630	1607042-11	WQ-ECH_062916_SW_10	T	Methyl mercury	0.071		0.071	U	BL1	NG/L
1607042	EPA 1630	1607042-13	WQ-FPT_062916_SW_10	T	Methyl mercury	0.044	J	0.05	U	BL1	NG/L
1607042	EPA 1630	1607042-15	WQ-ECH_062916_SW_10_DUP	T	Methyl mercury	0.063		0.063	U	BL1	NG/L
L1620423	9060A	L1620423-01	OV-02_062916_SW_10	D	Dissolved Organic Carbon	4.7		4.7	J	MS-L	MG/L
L1620423	9060A	L1620423-02	WQ161B-C_062916_SW_10	D	Dissolved Organic Carbon	3.9		3.9	J	MS-L	MG/L
L1620423	9060A	L1620423-03	WQ2-C_063016_SW_10	D	Dissolved Organic Carbon	0.76	J	0.76	J	MS-L	MG/L
L1620423	9060A	L1620423-04	WQ3-L_062916_SW_10	D	Dissolved Organic Carbon	0.41	J	0.41	J	MS-L	MG/L
L1620423	9060A	L1620423-05	ES-15_062916_SW_10	D	Dissolved Organic Carbon	0.27	J	0.27	J	MS-L	MG/L
L1620423	9060A	L1620423-06	WQ-ECH_062916_SW_10	D	Dissolved Organic Carbon	0.22	J	0.22	J	MS-L	MG/L
L1620423	9060A	L1620423-07	WQ-FPT_062916_SW_10	D	Dissolved Organic Carbon	0.34	J	0.34	J	MS-L	MG/L
L1620423	9060A	L1620423-08	WQ-ECH_062916_SW_10_DUP	D	Dissolved Organic Carbon	0.24	J	0.24	J	MS-L	MG/L

Units:
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = not detected

Validation Reason Codes:
BL1 = Method blank contamination
MS-L = MS and/or MSD receovery low

Fraction:
D = dissolved
T = total

TABLE 3
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1607042

			Location ID	WQ-ECH		WQ-ECH	
			Sample Name	WQ-ECH_062916_SW_10		WQ-ECH_062916_SW_10_DUP	
			Sample Date	6/29/2016		6/29/2016	
			Sample Type	FS		FD	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.071	U	0.063	U
EPA 1631	Total	Mercury	NG/L	2.3		2.37	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	1.06	U	1.18	U
2540D	Total	Total Suspended Solids	MG/L	11		10	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.22	J	0.24	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1607042

			Location ID	WQ-FPT		ES-15		WQ3-L	
			Sample Name	WQ-FPT_062916_SW_10		ES-15_062916_SW_10		WQ3-L_062916_SW_10	
			Sample Date	6/29/2016		6/29/2016		6/29/2016	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.05	U	0.05	U	0.058	U
EPA 1631	Total	Mercury	NG/L	1.67	U	1.87	U	2.5	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	0.68	U	0.59	U	0.97	U
2540D	Total	Total Suspended Solids	MG/L	6.5		11		24	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.34	J	0.27	J	0.41	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1607042

			Location ID	WQ1b-C		OV-02		WQ2-C	
			Sample Name	WQ1b-c_062916_SW_10		OV-02_062916_SW_10		WQ2-c_063016_SW_10	
			Sample Date	6/29/2016		6/29/2016		6/30/2016	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.617		0.169	U	0.06	U
EPA 1631	Total	Mercury	NG/L	37.2		1.82	U	3.31	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.066	U	0.127	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	1.87	U	1.19	U	1.38	U
2540D	Total	Total Suspended Solids	MG/L	50		5	U	6.8	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	3.9	J	4.7	J	0.76	J

Units:

MG/L = milligrams per liter

NG/L = nanograms per liter

Validation Qualifier:

J = value is estimated

U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JUNE 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607042, L1607042

			Location ID	QC	
			Sample Name	EB_062916_SW_QC	
			Sample Date	6/29/2016	
			Sample Type	EB	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L		
EPA 1631	Total	Mercury	NG/L		
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	0.5	U
2540D	Total	Total Suspended Solids	MG/L		
9060A	Dissolved	Dissolved Organic Carbon	MG/L		

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Data Validation Summary
July 2016 Surface Water
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in July 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery groups (SDG) 1607586 and 1607805. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDGs L1622656 and L1623305. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Dissolved Organic Carbon	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination
LD = Laboratory duplicate limit exceeded
MS-L = MS and/or MSD recovery low

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
Matrix Spike/Matrix Spike Duplicates (MS/MSD)
Laboratory Duplicates
* Field Duplicates
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

Results were determined to be usable as reported by the laboratory.

3.0 Mercury – 1631

<u>Blanks</u>

SDG 1607586 – Mercury was detected in the prep blank at a concentration of 0.24 ng/L. An action level was established at five times the concentration reported in the prep blank and compared to sample results. Dissolved results for samples WQ1b-c_071816_SW_10, WQ3-L_071816_SW_10, ES-15_071816_SW_10, WQ-ECH_071816_SW_10, and WQ-ECH_071816_SW_10_DUP were less than the action level and were qualified non-detect (U).

4.0 Dissolved Organic Carbon – 9060A

<u>Matrix Spike/Matrix Spike Duplicates</u>

SDG L1622656 and L1623305 – Sample WQ1b-C_071816_SW_10 was used for MS analysis. The MS percent recovery for DOC (29%) was less than the lower QC limit of 80%. All DOC sample results included in this report were qualified estimated (J) and are potentially biased low.

5.0 Total Suspended Solids – 2540D

Laboratory Duplicates

SDG L1622656 and L1623305 – Sample ADD-02_072216_SW_10 was selected by the laboratory for duplicate analysis. The RPD (89) between the sample and the laboratory duplicate analysis exceeded the QC limit of 29. Based on professional judgment, the TSS result only for sample ADD-02_072216_SW_10 was qualified estimated (J).

References:

Amec Foster Wheeler, 2016. "Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan", Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA"; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use"; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review"; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Wolfgang D. Calicchio November 29, 2016

Senior Reviewer: Denise King December 5, 2016

TABLE 1
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Dissolved	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**						
1607586	SW	ES-15	ES-15_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	OV-02	OV-02_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	BW	QC	EB_071916_SW_QC	7/18/2016	EB		1		1		
1607586	SW	WQ-ECH	WQ-ECH_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ-ECH	WQ-ECH_071816_SW_10_DUP	7/18/2016	FD	1	1	1	1		
1607586	SW	WQ-FPT	WQ-FPT_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ1b-C	WQ1b-c_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ2-C	WQ2-c_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ3-L	WQ3-L_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607805	SW	ADD-02	ADD-02_072216_SW_10	7/22/2016	FS	1	1	1	1		
L1622656	SW	ES-15	ES-15_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	OV-02	OV-02_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ-ECH	WQ-ECH_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ-ECH	WQ-ECH_071816_SW_10_DUP	7/18/2016	FD					1	1
L1622656	SW	WQ-FPT	WQ-FPT_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ1b-C	WQ1B-C_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ2-C	WQ2-C_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ3-L	WQ3-L_071816_SW_10	7/18/2016	FS					1	1
L1623305	SW	ADD-02	ADD-02_072216_SW_10	7/22/2016	FS					1	1

Notes:
BW = Blank Water
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
DOC = Dissolved Organic Carbon
TSS = Total Suspended Solids
QC = Quality Control
Count = # of analytes

TABLE 2
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validation Qualifier	Validation Reason Code	Result Units
1607586	EPA 1631	1607586-04	WQ1b-c_071816_SW_10	D	Mercury	1.16		1.16	U	BL1	NG/L
1607586	EPA 1631	1607586-08	WQ3-L_071816_SW_10	D	Mercury	1.2		1.2	U	BL1	NG/L
1607586	EPA 1631	1607586-10	ES-15_071816_SW_10	D	Mercury	0.63		0.63	U	BL1	NG/L
1607586	EPA 1631	1607586-12	WQ-ECH_071816_SW_10	D	Mercury	0.58		0.58	U	BL1	NG/L
1607586	EPA 1631	1607586-14	WQ-ECH_071816_SW_10_DUP	D	Mercury	0.58		0.58	U	BL1	NG/L
L1622656	9060A	L1622656-01	OV-02_071816_SW_10	D	Dissolved Organic Carbon	5.8		5.8	J	MS-L	MG/L
L1622656	9060A	L1622656-02	WQ1B-C_071816_SW_10	D	Dissolved Organic Carbon	2.4		2.4	J	MS-L	MG/L
L1622656	9060A	L1622656-03	WQ2-C_071816_SW_10	D	Dissolved Organic Carbon	0.76	J	0.76	J	MS-L	MG/L
L1622656	9060A	L1622656-04	WQ3-L_071816_SW_10	D	Dissolved Organic Carbon	0.41	J	0.41	J	MS-L	MG/L
L1622656	9060A	L1622656-05	ES-15_071816_SW_10	D	Dissolved Organic Carbon	0.24	J	0.24	J	MS-L	MG/L
L1622656	9060A	L1622656-06	WQ-ECH_071816_SW_10	D	Dissolved Organic Carbon	0.29	J	0.29	J	MS-L	MG/L
L1622656	9060A	L1622656-07	WQ-ECH_071816_SW_10_DUP	D	Dissolved Organic Carbon	0.24	J	0.24	J	MS-L	MG/L
L1622656	9060A	L1622656-08	WQ-FPT_071816_SW_10	D	Dissolved Organic Carbon	0.19	J	0.19	J	MS-L	MG/L
L1623305	9060A	L1623305-01	ADD-02_072216_SW_10	D	Dissolved Organic Carbon	3.3		3.3	J	MS-L	MG/L
L1623305	2540D	L1623305-01	ADD-02_072216_SW_10	T	Total Suspended Solids	400		400	J	LD	MG/L

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Reason Codes:
BL1 = Method blank contamination
LD = Laboratory duplicate limit exceeded
MS-L = MS and/or MSD recovery low

Validation Qualifier:
J = value is estimated
U = not detected

Fraction:
D = dissolved
T = total

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	ES-15		OV-02		QC		WQ-ECH	
			Sample Name	ES-15_071816_SW_10		OV-02_071816_SW_10		EB_071916_SW_QC		WQ-ECH_071816_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/18/2016		7/18/2016	
			Sample Type	FS		FS		EB		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.043	J	0.141				0.067	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.047	J	0.107		0.05	U	0.05	U
EPA 1631	Total	Mercury	NG/L	1.72		1.68				2.55	
EPA 1631	Dissolved	Mercury	NG/L	0.63	U	1.26		0.5	U	0.58	U
2540D	Total	Total Suspended Solids	MG/L	8.7		5	U			9.2	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.24	J	5.8	J			0.29	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	WQ-ECH		WQ-FPT		WQ1b-C	
			Sample Name	WQ-ECH_071816_SW_10_DUP		WQ-FPT_071816_SW_10		WQ1B-C_071816_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/18/2016	
			Sample Type	FD		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.071		0.035	J	0.259	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U	0.116	
EPA 1631	Total	Mercury	NG/L	2.59		1.44		5.86	
EPA 1631	Dissolved	Mercury	NG/L	0.58	U	0.5		1.16	U
2540D	Total	Total Suspended Solids	MG/L	9.5		7.2		10	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.24	J	0.19	J	2.4	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	WQ2-C		WQ3-L		ADD-02	
			Sample Name	WQ2-C_071816_SW_10		WQ3-L_071816_SW_10		ADD-02_072216_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/22/2016	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.36		0.132		0.779	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.142		0.05	U	0.154	
EPA 1631	Total	Mercury	NG/L	16.1		8.05		20.7	
EPA 1631	Dissolved	Mercury	NG/L	8.71		1.2	U	1.81	
2540D	Total	Total Suspended Solids	MG/L	18		14		400	J
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.76	J	0.41	J	3.3	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Data Validation Summary
July 2016 Surface Water
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in July 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery groups (SDG) 1607586 and 1607805. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDGs L1622656 and L1623305. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Dissolved Organic Carbon	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination
LD = Laboratory duplicate limit exceeded
MS-L = MS and/or MSD recovery low

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
Matrix Spike/Matrix Spike Duplicates (MS/MSD)
Laboratory Duplicates
* Field Duplicates
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

Results were determined to be usable as reported by the laboratory.

3.0 Mercury – 1631

<u>Blanks</u>

SDG 1607586 – Mercury was detected in the prep blank at a concentration of 0.24 ng/L. An action level was established at five times the concentration reported in the prep blank and compared to sample results. Dissolved results for samples WQ1b-c_071816_SW_10, WQ3-L_071816_SW_10, ES-15_071816_SW_10, WQ-ECH_071816_SW_10, and WQ-ECH_071816_SW_10_DUP were less than the action level and were qualified non-detect (U).

4.0 Dissolved Organic Carbon – 9060A

<u>Matrix Spike/Matrix Spike Duplicates</u>

SDG L1622656 and L1623305 – Sample WQ1b-C_071816_SW_10 was used for MS analysis. The MS percent recovery for DOC (29%) was less than the lower QC limit of 80%. All DOC sample results included in this report were qualified estimated (J) and are potentially biased low.

5.0 Total Suspended Solids – 2540D

Laboratory Duplicates

SDG L1622656 and L1623305 – Sample ADD-02_072216_SW_10 was selected by the laboratory for duplicate analysis. The RPD (89) between the sample and the laboratory duplicate analysis exceeded the QC limit of 29. Based on professional judgment, the TSS result only for sample ADD-02_072216_SW_10 was qualified estimated (J).

References:

Amec Foster Wheeler, 2016. “Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan”, Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA”; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use”; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review”; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures”; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Wolfgang D. Calicchio November 29, 2016

Senior Reviewer: Denise King December 5, 2016

TABLE 1
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Dissolved	Total
SDG	**Media**	**Location**	**Field Sample ID**	**Sample Date**	**QC Code**						
1607586	SW	ES-15	ES-15_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	OV-02	OV-02_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	BW	QC	EB_071916_SW_QC	7/18/2016	EB		1		1		
1607586	SW	WQ-ECH	WQ-ECH_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ-ECH	WQ-ECH_071816_SW_10_DUP	7/18/2016	FD	1	1	1	1		
1607586	SW	WQ-FPT	WQ-FPT_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ1b-C	WQ1b-c_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ2-C	WQ2-c_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607586	SW	WQ3-L	WQ3-L_071816_SW_10	7/18/2016	FS	1	1	1	1		
1607805	SW	ADD-02	ADD-02_072216_SW_10	7/22/2016	FS	1	1	1	1		
L1622656	SW	ES-15	ES-15_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	OV-02	OV-02_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ-ECH	WQ-ECH_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ-ECH	WQ-ECH_071816_SW_10_DUP	7/18/2016	FD					1	1
L1622656	SW	WQ-FPT	WQ-FPT_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ1b-C	WQ1B-C_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ2-C	WQ2-C_071816_SW_10	7/18/2016	FS					1	1
L1622656	SW	WQ3-L	WQ3-L_071816_SW_10	7/18/2016	FS					1	1
L1623305	SW	ADD-02	ADD-02_072216_SW_10	7/22/2016	FS					1	1

Notes:
BW = Blank Water
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
DOC = Dissolved Organic Carbon
TSS = Total Suspended Solids
QC = Quality Control
Count = # of analytes

TABLE 2
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validation Qualifier	Validation Reason Code	Result Units
1607586	EPA 1631	1607586-04	WQ1b-c_071816_SW_10	D	Mercury	1.16		1.16	U	BL1	NG/L
1607586	EPA 1631	1607586-08	WQ3-L_071816_SW_10	D	Mercury	1.2		1.2	U	BL1	NG/L
1607586	EPA 1631	1607586-10	ES-15_071816_SW_10	D	Mercury	0.63		0.63	U	BL1	NG/L
1607586	EPA 1631	1607586-12	WQ-ECH_071816_SW_10	D	Mercury	0.58		0.58	U	BL1	NG/L
1607586	EPA 1631	1607586-14	WQ-ECH_071816_SW_10_DUP	D	Mercury	0.58		0.58	U	BL1	NG/L
L1622656	9060A	L1622656-01	OV-02_071816_SW_10	D	Dissolved Organic Carbon	5.8		5.8	J	MS-L	MG/L
L1622656	9060A	L1622656-02	WQ1B-C_071816_SW_10	D	Dissolved Organic Carbon	2.4		2.4	J	MS-L	MG/L
L1622656	9060A	L1622656-03	WQ2-C_071816_SW_10	D	Dissolved Organic Carbon	0.76	J	0.76	J	MS-L	MG/L
L1622656	9060A	L1622656-04	WQ3-L_071816_SW_10	D	Dissolved Organic Carbon	0.41	J	0.41	J	MS-L	MG/L
L1622656	9060A	L1622656-05	ES-15_071816_SW_10	D	Dissolved Organic Carbon	0.24	J	0.24	J	MS-L	MG/L
L1622656	9060A	L1622656-06	WQ-ECH_071816_SW_10	D	Dissolved Organic Carbon	0.29	J	0.29	J	MS-L	MG/L
L1622656	9060A	L1622656-07	WQ-ECH_071816_SW_10_DUP	D	Dissolved Organic Carbon	0.24	J	0.24	J	MS-L	MG/L
L1622656	9060A	L1622656-08	WQ-FPT_071816_SW_10	D	Dissolved Organic Carbon	0.19	J	0.19	J	MS-L	MG/L
L1623305	9060A	L1623305-01	ADD-02_072216_SW_10	D	Dissolved Organic Carbon	3.3		3.3	J	MS-L	MG/L
L1623305	2540D	L1623305-01	ADD-02_072216_SW_10	T	Total Suspended Solids	400		400	J	LD	MG/L

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Reason Codes:
BL1 = Method blank contamination
LD = Laboratory duplicate limit exceeded
MS-L = MS and/or MSD recovery low

Validation Qualifier:
J = value is estimated
U = not detected

Fraction:
D = dissolved
T = total

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	ES-15		OV-02		QC		WQ-ECH	
			Sample Name	ES-15_071816_SW_10		OV-02_071816_SW_10		EB_071916_SW_QC		WQ-ECH_071816_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/18/2016		7/18/2016	
			Sample Type	FS		FS		EB		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.043	J	0.141				0.067	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.047	J	0.107		0.05	U	0.05	U
EPA 1631	Total	Mercury	NG/L	1.72		1.68				2.55	
EPA 1631	Dissolved	Mercury	NG/L	0.63	U	1.26		0.5	U	0.58	U
2540D	Total	Total Suspended Solids	MG/L	8.7		5	U			9.2	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.24	J	5.8	J			0.29	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	WQ-ECH		WQ-FPT		WQ1b-C	
			Sample Name	WQ-ECH_071816_SW_10_DUP		WQ-FPT_071816_SW_10		WQ1B-C_071816_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/18/2016	
			Sample Type	FD		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.071		0.035	J	0.259	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U	0.116	
EPA 1631	Total	Mercury	NG/L	2.59		1.44		5.86	
EPA 1631	Dissolved	Mercury	NG/L	0.58	U	0.5		1.16	U
2540D	Total	Total Suspended Solids	MG/L	9.5		7.2		10	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.24	J	0.19	J	2.4	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

TABLE 3
DATA VALIDATION SUMMARY REPORT
JULY 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1607586, 1607805, L1622656, L1623305

			Location ID	WQ2-C		WQ3-L		ADD-02	
			Sample Name	WQ2-C_071816_SW_10		WQ3-L_071816_SW_10		ADD-02_072216_SW_10	
			Sample Date	7/18/2016		7/18/2016		7/22/2016	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.36		0.132		0.779	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.142		0.05	U	0.154	
EPA 1631	Total	Mercury	NG/L	16.1		8.05		20.7	
EPA 1631	Dissolved	Mercury	NG/L	8.71		1.2	U	1.81	
2540D	Total	Total Suspended Solids	MG/L	18		14		400	J
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.76	J	0.41	J	3.3	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Data Validation Summary
August 2016 Surface Water and Sediment Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in August 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery group (SDG) 1608981. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDGs L1627358 and L1629834. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Organic Carbon, total and dissolved	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIb data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

Data Completeness and Chain of Custody
* Holding Times and Preservation
Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
* Matrix Spike/Matrix Spike Duplicates (MS/MSD)
* Laboratory Duplicates
* Field Duplicates
* Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

Results were determined to be usable as reported by the laboratory.

3.0 Mercury – 1631

Blanks

SDG 1608981 – Mercury was detected in the prep blank associated with a subset of samples at a concentration of 2.79 ng/L. An action level was established at five times the concentration reported in the prep blank. Total and dissolved results for samples OV-02_082916_SW_10 and OV-02_082916_SW_10_DUP and dissolved results for samples WQ-ECH_082916_SW_10 and ES-15_082916_SW_10 were less than the action level and were qualified non-detect (U) with reason code BL1.

SDG 1608981 – Mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.22 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Dissolved results for samples WQ-2-C_083016_SW_10, WQ-3-L_083016_SW_10 and WQ-FPT_083016_SW_10 were less than the action level and were qualified non-detect (U) with reason code BL1.

4.0 Total Organic Carbon – 9060A

Results were determined to be usable as reported by the laboratory.

5.0 Dissolved Organic Carbon – 9060A

Results were determined to be usable as reported by the laboratory.

6.0 Total Suspended Solids – 2540D

L1627358 – The TSS container for sample WQ_1b-C_083016_SW_10 was received at the laboratory with the cover unattached. TSS analysis was not able to be performed and results are not available.

Results were determined to be usable as reported by the laboratory.

References:

Amec Foster Wheeler, 2016. "Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan", Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA"; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use"; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review"; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Julie Pallozzi November 23, 2016

Senior Reviewer: Denise King December 5, 2016

TABLE 1
DATA VALIDATION SUMMARY REPORT
AUGUST 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1608981, L1627358, L1629834

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	TOC	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
SDG	**Location**	**Field Sample ID**	**Sample Date**	**Media**	**QC Code**	Count	Count	Count	Count	Count	Count	Count
1608981	ES-15	ES-15_082916_SW_10	8/29/2016	SW	FS	1	1	1	1			
1608981	OV-02	OV02_082916_SW_10	8/29/2016	SW	FS	1	1	1	1			
1608981	OV-02	OV02_082916_SW_10_DUP	8/29/2016	SW	FD	1	1	1	1			
1608981	WQ-ECH	WQ-ECH_082916_SW_10	8/29/2016	SW	FS	1	1	1	1			
1608981	WQ-FPT	WQ_FPT_083016_SW_10	8/30/2016	SW	FS	1	1	1	1			
1608981	WQ1b-C	WQ_1B-C_083016_SW_10	8/30/2016	SW	FS	1	1	1	1			
1608981	WQ2-C	WQ-2-C_083016_SW_10	8/30/2016	SW	FS	1	1	1	1			
1608981	WQ3-L	WQ-3-L_083016_SW_10	8/30/2016	SW	FS	1	1	1	1			
1608981	QC	EB_083016_SW_QC	8/30/2016	BW	EB	1	1	1	1			
L1627358	ES-15	ES-15_082916_SW_10	8/29/2016	SW	FS						1	1
L1627358	OV-02	OV02_082916_SW_10	8/29/2016	SW	FS						1	1
L1627358	OV-02	OV02_082916_SW_10_DUP	8/29/2016	SW	FD						1	1
L1627358	WQ-ECH	WQ-ECH_082916_SW_10	8/29/2016	SW	FS						1	1
L1627358	WQ-FPT	WQ_FPT_083016_SW_10	8/30/2016	SW	FS						1	1
L1627358	WQ1b-C	WQ_1B-C_083016_SW_10	8/30/2016	SW	FS						1	
L1627358	WQ2-C	WQ-2-C_083016_SW_10	8/30/2016	SW	FS						1	1
L1627358	WQ3-L	WQ-3-L_083016_SW_10	8/30/2016	SW	FS						1	1
L1629834	ES-15	ES-15_082916_SW_10	8/29/2016	SW	FS					1		
L1629834	OV-02	OV02_082916_SW_10	8/29/2016	SW	FS					1		
L1629834	OV-02	OV02_082916_SW_10_DUP	8/29/2016	SW	FD					1		
L1629834	WQ-ECH	WQ-ECH_082916_SW_10	8/29/2016	SW	FS					1		
L1629834	WQ-FPT	WQ_FPT_083016_SW_10	8/30/2016	SW	FS					1		
L1629834	WQ1b-C	WQ_1B-C_083016_SW_10	8/30/2016	SW	FS					1		
L1629834	WQ2-C	WQ-2-C_083016_SW_10	8/30/2016	SW	FS					1		
L1629834	WQ3-L	WQ-3-L_083016_SW_10	8/30/2016	SW	FS					1		

Notes:

BW = Blank Water
DOC = Dissolved Organic Carbon
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
TOC = Total Organic Carbon
TSS = Total Suspended Solids
Count = Number of analytes

TABLE 2
DATA VALIDATION SUMMARY REPORT
AUGUST 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1608981, L1627358, L1629834

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validated Qualifier	Validation Reason Code	Result Units
1608981	EPA 1631	1608981-14	ES-15_082916_SW_10	D	Mercury	2.7		2.7	U	BL1	NG/L
1608981	EPA 1631	1608981-16	OV-02_082916_SW_10	D	Mercury	1.27		1.27	U	BL1	NG/L
1608981	EPA 1631	1608981-15	OV-02_082916_SW_10	T	Mercury	2.16		2.16	U	BL1	NG/L
1608981	EPA 1631	1608981-18	OV-02_082916_SW_10_DUP	D	Mercury	1.18		1.18	U	BL1	NG/L
1608981	EPA 1631	1608981-17	OV-02_082916_SW_10_DUP	T	Mercury	1.62		1.62	U	BL1	NG/L
1608981	EPA 1631	1608981-12	WQ-ECH_082916_SW_10	D	Mercury	0.94		0.94	U	BL1	NG/L
1608981	EPA 1631	1608981-10	WQ_FPT_083016_SW_10	D	Mercury	0.5	J	0.5	U	BL1	NG/L
1608981	EPA 1631	1608981-06	WQ-2-C_083016_SW_10	D	Mercury	1.1		1.1	U	BL1	NG/L
1608981	EPA 1631	1608981-08	WQ-3-L_083016_SW_10	D	Mercury	0.59		0.59	U	BL1	NG/L

Units:
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = not detected

Validation Reason Codes:
BL1 = Method blank contamination

Fraction:
D = dissolved
T = total

TABLE 3
DATA VALIDATION SUMMARY REPORT
AUGUST 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1608981, L1627358, L1629834

			Location ID	ES-15		OV-02		OV-02	
			Sample Name	ES-15_082916_SW_10		OV-02_082916_SW_10		OV-02_082916_SW_10_DUP	
			Sample Date	08/29/16		08/29/16		08/29/16	
			Sample Type	FS		FS		FD	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.345		0.205		0.167	
EPA 1631	Total	Mercury	NG/L	21		2.16	U	1.62	U
EPA 1630	Dissolved	Methyl mercury	NG/L	0.055		0.127		0.105	
EPA 1631	Dissolved	Mercury	NG/L	2.7	U	1.27	U	1.18	U
2540D	Total	Total Suspended Solids	MG/L	52		5	U	5	U
9060A	Total	Total Organic Carbon	MG/L	0.36	J	7		6.9	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.19	J	7.4		7	

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

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Created by: BCG 11/28/16
Checked by: JPP 11/30/16

TABLE 3
DATA VALIDATION SUMMARY REPORT
AUGUST 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1608981, L1627358, L1629834

			Location ID	WQ-ECH		WQ-FPT		WQ1b-C	
			Sample Name	WQ-ECH_082916_SW_10		WQ_FPT_083016_SW_10		WQ_1B-C_083016_SW_10	
			Sample Date	08/29/16		08/30/16		08/30/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.155		0.04	J	0.336	
EPA 1631	Total	Mercury	NG/L	9.14		1.87		7.83	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U	0.129	
EPA 1631	Dissolved	Mercury	NG/L	0.94	U	0.5	U	1.23	
2540D	Total	Total Suspended Solids	MG/L	25		11			
9060A	Total	Total Organic Carbon	MG/L	0.39	J	0.31	J	6.3	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.41	J	0.17	J	6.8	

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

TABLE 3
DATA VALIDATION SUMMARY REPORT
AUGUST 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1608981, L1627358, L1629834

			Location ID	WQ2-C		WQ3-L		QC	
			Sample Name	WQ-2-C_083016_SW_10		WQ-3-L_083016_SW_10		EB_083016_SW_QC	
			Sample Date	08/30/16		08/30/16		08/30/16	
			Sample Type	FS		FS		EB	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.118		0.106		0.05	U
EPA 1631	Total	Mercury	NG/L	3.72		6		0.5	U
EPA 1630	Dissolved	Methyl mercury	NG/L	0.058		0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	1.1	U	0.59	U	0.5	U
2540D	Total	Total Suspended Solids	MG/L	6.8		10			
9060A	Total	Total Organic Carbon	MG/L	1.5		0.38	J		
9060A	Dissolved	Dissolved Organic Carbon	MG/L	1.3		0.23	J		

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

Validation Qualifier:
J = value is estimated
U = Analyte not detected above the reporting limit

Data Validation Summary
September 2016 Surface Water and Sediment Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in September 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery group (SDG) 1610097. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDG L1631095. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Organic Carbon, total and dissolved	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIB data validation was completed on all SDGs**.** A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit
UJ = The target compound was not detected and the reporting limit is considered to be estimated

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination
LD = Lab Duplicate limit exceeded
MS-H = Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery high
MS-L = MS/MSD recovery low

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
MS/MSD
* Laboratory Duplicates
* Field Duplicates
Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

<u>Matrix Spike/ Matrix Spike Duplicate</u>

SDG 1610097 – Sample WQ1b-c_092716_SW-10 was submitted for MS/MSD analysis. The MS/MSD percent recoveries for total methyl mercury (145/144) and dissolved methyl mercury (151/146) were greater than the upper QC limit of 130%. Total and dissolved methyl mercury sample results were qualified estimated (J) with reason code MS-H and are potentially biased high.

3.0 Mercury – 1631

<u>Blanks</u>

SDG 1610097 – Mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.32 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. Dissolved results for samples OV-02_092716_SW_10, WQ1b-c_092716_SW_10, WQ1b-c_092716_SW_10_DUP, WQ2-C_092616_SW_10, WQ3-L_092616_SW_10, and WQ-ECH_092616_SW_10 were less than the action level and were qualified non-detect (U) with reason code BL1. A low concentration result for dissolved mercury in sample WQ-FPT_092616_SW_10 was less than the action level and less than the reporting limit and was qualified non-detect (U) at the reporting limit with reason code BL1.

4.0 Total Organic Carbon – 9060A

Matrix Spike/ Matrix Spike Duplicate

SDG L1631095 – Sample WQ1b-c_092716_SW-10 was submitted for MS analysis. The MS percent recovery for TOC (70) was less than the lower QC limit of 80%. TOC sample results were qualified estimated (J/UJ) with reason code MS-L and are potentially biased low.

Laboratory Duplicates

SDG L1631095 – Sample WQ1b-c_092716_SW-10 was selected by the laboratory for duplicate analysis. The RPD (24) between the sample and the laboratory duplicate analysis exceeded the QC limit of 20. Based on professional judgment, the TOC result only for sample WQ1b-c_092716_SW-10 was qualified estimated (J) with reason code LD.

Detection Limits

SDG L1631095 – Samples ES-15_092616_SW_10, WQ-ECH_092616_SW_10 and WQ-FPT_092616_SW_10 were analyzed at a dilution and results were non-detect. Elevated reporting limits were provided.

5.0 Dissolved Organic Carbon – 9060A

Matrix Spike/ Matrix Spike Duplicate

SDG L1631095 – Sample WQ1b-c_092716_SW-10 was submitted for MS analysis. The MS percent recovery for DOC (40) was less than the lower QC limit of 80. DOC sample results were qualified estimated (J) with reason code MS-L and are potentially biased low.

6.0 Total Suspended Solids – 2540D

Results were determined to be usable as reported by the laboratory.

References:

Amec Foster Wheeler, 2016. “Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan”, Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA”; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use”; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review”; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures”; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Julie Pallozzi November 29, 2016

Julie Pallozzi

Senior Reviewer: Denise King December 6, 2016

Denise King

TABLE 1
DATA VALIDATION SUMMARY REPORT
SEPTEMBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610097, L1631095

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	TOC	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
SDG	**Location**	**Field Sample ID**	**Sample Date**	**Media**	**QC Code**	Count	Count	Count	Count	Count	Count	Count
1610097	ES-15	ES-15_092616_SW_10	09/26/16	SW	FS	1	1	1	1			
1610097	OV-02	OV-02_092716_SW_10	09/27/16	SW	FS	1	1	1	1			
1610097	QC	EB_092716_SW_QC	09/27/16	BW	EB	1	1	1	1			
1610097	WQ-ECH	WQ-ECH_092616_SW_10	09/26/16	SW	FS	1	1	1	1			
1610097	WQ-FPT	WQ-FPT_092616_SW_10	09/26/16	SW	FS	1	1	1	1			
1610097	WQ1b-C	WQ1B-C_092716_SW_10	09/27/16	SW	FS	1	1	1	1			
1610097	WQ1b-C	WQ1B-C_092716_SW_10_DUP	09/27/16	SW	FD	1	1	1	1			
1610097	WQ2-C	WQ2-C_092616_SW_10	09/26/16	SW	FS	1	1	1	1			
1610097	WQ3-L	WQ3-L_092616_SW_10	09/26/16	SW	FS	1	1	1	1			
L1631095	ES-15	ES-15_092616_SW_10	09/26/16	SW	FS					1	1	1
L1631095	OV-02	OV-02_092716_SW_10	09/27/16	SW	FS					1	1	1
L1631095	WQ-ECH	WQ-ECH_092616_SW_10	09/26/16	SW	FS					1	1	1
L1631095	WQ-FPT	WQ-FPT_092616_SW_10	09/26/16	SW	FS					1	1	1
L1631095	WQ1b-C	WQ1B-C_092716_SW_10	09/27/16	SW	FS					1	1	1
L1631095	WQ1b-C	WQ1B-C_092716_SW_10_DUP	09/27/16	SW	FD					1	1	1
L1631095	WQ2-C	WQ2-C_092616_SW_10	09/26/16	SW	FS					1	1	1
L1631095	WQ3-L	WQ3-L_092616_SW_10	09/26/16	SW	FS					1	1	1

Notes:
BW = Blank Water
DOC = Dissolved Organic Carbon
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
TOC = Total Organic Carbon
TSS = Total Suspended Solids
Count = Number of analytes

Created by: BCG 10/31/16
Checked by: JPP 11/29/16

TABLE 2
DATA VALIDATION SUMMARY REPORT
SEPTEMBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610097, L1631095

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validated Qualifier	Val Reason Code	Result Units
1610097	EPA 1631	1610097-02RE1	OV-02_092716_SW_10	D	Mercury	0.66		0.66	U	BL1	NG/L
1610097	EPA 1631	1610097-12	WQ-ECH_092616_SW_10	D	Mercury	1.34		1.34	U	BL1	NG/L
1610097	EPA 1631	1610097-14	WQ-FPT_092616_SW_10	D	Mercury	0.44	J	0.5	U	BL1	NG/L
1610097	EPA 1631	1610097-04	WQ1B-C_092716_SW_10	D	Mercury	0.78		0.78	U	BL1	NG/L
1610097	EPA 1631	1610097-16	WQ1B-C_092716_SW_10_DUP	D	Mercury	0.84		0.84	U	BL1	NG/L
1610097	EPA 1631	1610097-06	WQ2-C_092616_SW_10	D	Mercury	0.79		0.79	U	BL1	NG/L
1610097	EPA 1631	1610097-08	WQ3-L_092616_SW_10	D	Mercury	1.13		1.13	U	BL1	NG/L
1610097	EPA 1630	1610097-09	ES-15_092616_SW_10	T	Methyl mercury	0.209		0.209	J	MS-H	NG/L
1610097	EPA 1630	1610097-02	OV-02_092716_SW_10	D	Methyl mercury	0.103		0.103	J	MS-H	NG/L
1610097	EPA 1630	1610097-01	OV-02_092716_SW_10	T	Methyl mercury	0.106		0.106	J	MS-H	NG/L
1610097	EPA 1630	1610097-11	WQ-ECH_092616_SW_10	T	Methyl mercury	0.036	J	0.036	J	MS-H	NG/L
1610097	EPA 1630	1610097-04	WQ1B-C_092716_SW_10	D	Methyl mercury	0.051		0.051	J	MS-H	NG/L
1610097	EPA 1630	1610097-03	WQ1B-C_092716_SW_10	T	Methyl mercury	0.162		0.162	J	MS-H	NG/L
1610097	EPA 1630	1610097-15	WQ1B-C_092716_SW_10_DUP	T	Methyl mercury	0.152		0.152	J	MS-H	NG/L
1610097	EPA 1630	1610097-16	WQ1B-C_092716_SW_10_DUP	D	Methyl mercury	0.112		0.112	J	MS-H	NG/L
1610097	EPA 1630	1610097-05	WQ2-C_092616_SW_10	T	Methyl mercury	0.062		0.062	J	MS-H	NG/L
1610097	EPA 1630	1610097-07	WQ3-L_092616_SW_10	T	Methyl mercury	0.036	J	0.036	J	MS-H	NG/L
L1631095	9060A	L1631095-05	ES-15_092616_SW_10	D	Dissolved Organic Carbon	0.07	J	0.07	J	MS-L	MG/L
L1631095	9060A	L1631095-01	OV-02_092716_SW_10	D	Dissolved Organic Carbon	5.2		5.2	J	MS-L	MG/L
L1631095	9060A	L1631095-06	WQ-ECH_092616_SW_10	D	Dissolved Organic Carbon	0.13	J	0.13	J	MS-L	MG/L
L1631095	9060A	L1631095-07	WQ-FPT_092616_SW_10	D	Dissolved Organic Carbon	0.08	J	0.08	J	MS-L	MG/L
L1631095	9060A	L1631095-02	WQ1B-C_092716_SW_10	D	Dissolved Organic Carbon	1.2		1.2	J	MS-L	MG/L
L1631095	9060A	L1631095-08	WQ1B-C_092716_SW_10_DUP	D	Dissolved Organic Carbon	0.95	J	0.95	J	MS-L	MG/L
L1631095	9060A	L1631095-03	WQ2-C_092616_SW_10	D	Dissolved Organic Carbon	0.57	J	0.57	J	MS-L	MG/L
L1631095	9060A	L1631095-04	WQ3-L_092616_SW_10	D	Dissolved Organic Carbon	0.29	J	0.29	J	MS-L	MG/L
L1631095	9060A	L1631095-05	ES-15_092616_SW_10	T	Total Organic Carbon	1	U	1	UJ	MS-L	MG/L
L1631095	9060A	L1631095-01	OV-02_092716_SW_10	T	Total Organic Carbon	5.5		5.5	J	MS-L	MG/L
L1631095	9060A	L1631095-06	WQ-ECH_092616_SW_10	T	Total Organic Carbon	1	U	1	UJ	MS-L	MG/L
L1631095	9060A	L1631095-07	WQ-FPT_092616_SW_10	T	Total Organic Carbon	1	U	1	UJ	MS-L	MG/L
L1631095	9060A	L1631095-02	WQ1B-C_092716_SW_10	T	Total Organic Carbon	2.8		2.8	J	MS-L, LD	MG/L
L1631095	9060A	L1631095-08	WQ1B-C_092716_SW_10_DUP	T	Total Organic Carbon	2.1		2.1	J	MS-L	MG/L
L1631095	9060A	L1631095-03	WQ2-C_092616_SW_10	T	Total Organic Carbon	1.7		1.7	J	MS-L	MG/L
L1631095	9060A	L1631095-04	WQ3-L_092616_SW_10	T	Total Organic Carbon	0.81	J	0.81	J	MS-L	MG/L

Fraction:
D = Dissolved
T = Total

Validation Qualifier:
J = Value is estimated
U = Not detected
UJ = Not detected, reporting limit is estimated

Validation Reason Codes:
BL1 = Method blank contamination
LD = Lab duplicate limit exceeded
MS-H = MS and/or MSD recovery high
MS-L = MS and/or MSD recovery low

Units:
NG/L = nanograms per liter
MG/L = milligrams per liter

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TABLE 3
DATA VALIDATION SUMMARY REPORT
SEPTEMBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610097, L1631095

			Location ID	ES-15		OV-02		WQ-ECH	
			Sample Name	ES-15_092616_SW_10		OV-02_092716_SW_10		WQ-ECH_092616_SW_10	
			Sample Date	09/26/16		09/27/16		09/26/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.209	J	0.106	J	0.036	J
EPA 1631	Total	Mercury	NG/L	7.59		0.5	U	2.62	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.103	J	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	2.29		0.66	U	1.34	U
2540D	Total	Total Suspended Solids	MG/L	16		5	U	9.2	
9060A	Total	Total Organic Carbon	MG/L	1	UJ	5.5	J	1	UJ
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.07	J	5.2	J	0.13	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit
UJ = Not detected, reporting limit is estimated

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TABLE 3
DATA VALIDATION SUMMARY REPORT
SEPTEMBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610097, L1631095

			Location ID	WQ-FPT		WQ1b-C		WQ1b-C	
			Sample Name	WQ-FPT_092616_SW_10		WQ1B-C_092716_SW_10		WQ1B-C_092716_SW_10_DUP	
			Sample Date	09/26/16		09/27/16		09/27/16	
			Sample Type	FS		FS		FD	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.05	U	0.162	J	0.152	J
EPA 1631	Total	Mercury	NG/L	1.63		1.99		2.09	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.051	J	0.112	J
EPA 1631	Dissolved	Mercury	NG/L	0.5	U	0.78	U	0.84	U
2540D	Total	Total Suspended Solids	MG/L	13		5	U	5	U
9060A	Total	Total Organic Carbon	MG/L	1	UJ	2.8	J	2.1	J
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.08	J	1.2	J	0.95	J

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit
UJ = Not detected, reporting limit is estimated

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TABLE 3
DATA VALIDATION SUMMARY REPORT
SEPTEMBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610097, L1631095

			Location ID	WQ2-C		WQ3-L		QC	
			Sample Name	WQ2-C_092616_SW_10		WQ3-L_092616_SW_10		EB_092716_SW_QC	
			Sample Date	09/26/16		09/26/16		09/27/16	
			Sample Type	FS		FS		EB	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.062	J	0.036	J	0.05	U
EPA 1631	Total	Mercury	NG/L	3.63		2.91		0.5	U
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	0.79	U	1.13	U	0.5	U
2540D	Total	Total Suspended Solids	MG/L	7.9		8.6			
9060A	Total	Total Organic Carbon	MG/L	1.7	J	0.81	J		
9060A	Dissolved	Dissolved Organic Carbon	MG/L	0.57	J	0.29	J		

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit
UJ = Not detected, reporting limit is estimated

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

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Data Validation Summary
October 2016 Surface Water and Sediment Sampling
Penobscot River Estuary Phase III – Engineering Evaluation
Penobscot River, Maine

1.0 INTRODUCTION

Surface water samples were collected in September 2016 for the Penobscot River located in Maine. Samples were analyzed by Eurofins Frontier Global Sciences, Inc. (Eurofins) located in Bothell, Washington and included in sample delivery group (SDG) 1610860. Samples were also analyzed by Alpha Analytical, Inc. (Alpha) located in Westborough, Massachusetts and included in SDG L1634797. Samples were analyzed by one or more of the following: United States Environmental Protection Agency (USEPA) SW-846 (USEPA, 2014), Clean Water Act (CWA, 2012), Standard Methods for the Examination of Water and Wastewater (SM, 1997):

Laboratory	Parameter	Analytical Method	Validation Level
Eurofins	Mercury, total and dissolved	CWA1631E	10% Stage III/ 90% Stage IIB
Eurofins	Methyl mercury, total and dissolved	CWA 1630	10% Stage III/ 90% Stage IIB
Alpha	Organic Carbon, total and dissolved	SW-846 9060A	10% Stage III/ 90% Stage IIB
Alpha	Total Suspended Solids	SM 2540D	10% Stage III/ 90% Stage IIB

A Stage IIB data validation was completed on all SDGs. A Stage III data validation was performed on ten percent of samples. Data validation was completed using National Functional Guidelines for Inorganic Superfund Data Review (USEPA, 2014) and EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (USEPA, 2013) where applicable. Data quality evaluations were completed using quality control (QC) limits specified in the draft Penobscot River Estuary Phase III Engineering Evaluation Quality Assurance Project Plan (QAPP) [Amec Foster Wheeler, 2016]. The project laboratory reported results using a combination of two detection limits including the reporting limit (RL) and the method detection limit (MDL). Results for compounds that are not detected in samples are reported as U qualified results at the RL. Positive detections between the MDL and RL are qualified as estimated (J) by the laboratory.

Data validation review and qualification actions are discussed in the following subsections. It should be noted that only instances that result in an impact to data quality are presented in this report. There may be QC elements outside of QAPP and/or method control limits not presented in this report since there is no impact to data quality. Samples included in this data evaluation are presented in Table 1.

Data qualifications were completed if necessary in accordance with the guidelines or the professional judgment of the project chemist. The following qualifiers as applied during data validation or reported by the laboratory are included in the final data set:

J = The reported concentration is considered an estimated value
U = The target compound was not detected above the method detection limit

Validation reason codes were applied to results associated with QC measurements outside project QC goals. The validation qualification actions and associated validation reason codes applied to sample results are summarized on Table 2. The following data validation reason codes were applied to one or more sample results:

BL1 = Method blank contamination
MS-H = Matrix Spike/Matrix Spike Duplicate (MS/MSD) recovery high

A complete summary of final sample results is provided in Table 3.

Data were evaluated based on the following parameters:

* Data Completeness and Chain of Custody
* Holding Times and Preservation
Blanks
* Initial Calibration
* Continuing Calibration
* Laboratory Control Sample (LCS)
MS/MSD
* Laboratory Duplicates
* Field Duplicates
Detection Limits
* Sample Result Verification/Electronic Evaluation Verification (EDD)
* Ongoing Precision Recovery

* = indicates that criteria were met and/or no impact to data quality for this parameter

With the exception of the following items discussed below, results were determined to be usable as reported by the laboratory.

2.0 Methyl Mercury – 1630

<u>Blanks</u>

SDG 1610860 – Methyl mercury was detected below the reporting limit in multiple blanks associated with a subset of samples. The highest blank concentration was 0.012 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to associated sample results. Low concentration results for total methyl mercury in sample ES-15_102616_SW_10 and dissolved methyl mercury in sample WQ-ECH_102616_SW_10 were less than the action level and less than the reporting limit and were qualified non-detect (U) at the reporting limit with reason code BL1.

<u>Matrix Spike/ Matrix Spike Duplicate</u>

SDG 1610860 – Sample WQ1b-c_102516_SW-10 was submitted for MS/MSD analysis. The MS and/or MSD percent recoveries for total methyl mercury (MS 131) and dissolved methyl mercury (MSD 141) were greater than the upper QC limit of 130%. Total and dissolved methyl mercury sample results were qualified estimated (J) with reason code MS-H and are potentially biased high.

3.0 Mercury – 1631

Blanks

SDG 1610860 – Mercury was detected below the reporting limit in multiple blanks with the highest concentration of 0.14 ng/L. An action level was established at five times the highest concentration reported in the blanks and compared to sample results. The dissolved mercury result for sample OV-02_102616_SW_10 was less than the action level and was qualified non-detect (U) with reason code BL1.

4.0 Total Organic Carbon – 9060A

Detection Limits

SDG L1634797 – Samples WQ-ECH_102616_SW_10 and WQ-3-L_102616_SW_10 were analyzed at a dilution due to the sample matrix and results were non-detect. Elevated detection limits were provided.

Results were determined to be usable as reported by the laboratory.

5.0 Dissolved Organic Carbon – 9060A

Detection Limits

SDG L1634797 – Samples ES-15_102616_SW_10, WQ-FPT_102616_SW_10 and WQ-ECH_102616_SW_10 were analyzed at a dilution due to the sample matrix and results were non-detect. Elevated detection limits were provided.

Results were determined to be usable as reported by the laboratory.

6.0 Total Suspended Solids – 2540D

Results were determined to be usable as reported by the laboratory.

References:

Amec Foster Wheeler, 2016. "Draft Penobscot River Estuary Phase III – Engineering Study Quality Assurance Project Plan", Penobscot River, Maine, July 2016.

U.S. Environmental Protection Agency (USEPA), 2004. "Final Update IIIB and Method 9071B of Final Update IIIA"; Test Methods for Evaluating Solid Waste Physical/Chemical Methods SW-846; Office of Solid Waste and Emergency Response, EPA-SW-846-03-03B; November 2004.

U.S. Environmental Protection Agency (USEPA), 2009. "Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use"; Office of Solid Waste and Emergency Response; EPA 540-R-08-005; January 13, 2009.

U.S. Environmental Protection Agency (USEPA), 2014. "National Functional Guidelines for Inorganic Superfund Data Review"; Office of Superfund Remediation and Technology Innovation; EPA-540-R-013-001; August 2014.

U.S. Environmental Protection Agency (USEPA), 2013. "EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures"; Quality Assurance Unit Staff; Office of Environmental Measurement and Evaluation; April 22, 2013.

Data Validator: Julie Pallozzi December 1, 2016

Julie Pallozzi

Senior Reviewer: Denise King December 6, 2016

Denise King

TABLE 1
DATA VALIDATION SUMMARY REPORT
OCTOBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610860, L1634797

					Method Class	Methyl Mercury	Methyl Mercury	Mercury	Mercury	TOC	DOC	TSS
					Analysis Method	EPA 1630	EPA 1630	EPA 1631	EPA 1631	9060A	9060A	2540D
					Fraction	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
SDG	**Location**	**Field Sample ID**	**Sample Date**	**Media**	**QC Code**	Count	Count	Count	Count	Count	Count	Count
1610860	ES-15	ES-15_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
1610860	OV-02	OV-02_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
1610860	QC	EB_102616_SW_QC	10/26/16	BW	EB	1	1	1	1			
1610860	WQ-ECH	WQ_ECH_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
1610860	WQ-FPT	WQ-FPT_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
1610860	WQ1b-C	WQ1B-C_102516_SW_10	10/25/16	SW	FS	1	1	1	1			
1610860	WQ1b-C	WQ1B-C_102516_SW_10_DUP	10/25/16	SW	FD	1	1	1	1			
1610860	WQ2-C	WQ2-C_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
1610860	WQ3-L	WQ3-L_102616_SW_10	10/26/16	SW	FS	1	1	1	1			
L1634797	ES-15	ES-15_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	OV-02	OV-02_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	QC	EB_102616_SW_QC	10/26/16	BW	FS					1	1	
L1634797	WQ-2C	WQ-2-C_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	WQ-3L	WQ-3-L_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	WQ-ECH	WQ-ECH_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	WQ-FPT	WQ-FPT_102616_SW_10	10/26/16	SW	FS					1	1	1
L1634797	WQ1b-C	WQ1B-C_102516_SW_10	10/25/16	SW	FS					1	1	1
L1634797	WQ1b-C	WQ1B-C_102516_SW_10_DUP	10/25/16	SW	FD					1	1	1

Notes:
BW = Blank Water
DOC = Dissolved Organic Carbon
EB = Equipment Blank
FD = Field Duplicate
FS = Field Sample
SW = Surface water
SDG = Sample Delivery Group
TOC = Total Organic Carbon
TSS = Total Suspended Solids
Count = Number of analytes

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TABLE 2
DATA VALIDATION SUMMARY REPORT
OCTOBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610860, L1634797

SDG	Analysis Method	Lab Sample ID	Field Sample ID	Fraction	Parameter Name	Lab Result	Lab Qualifier	Validated Result	Validated Qualifier	Val Reason Code	Result Units
1610860	EPA 1631	1610860-16	OV-02_102616_SW_10	D	Mercury	0.62		0.62	U	BL1	NG/L
1610860	EPA 1630	1610860-05	ES-15_102616_SW_10	T	Methyl mercury	0.045	J	0.05	U	BL1	NG/L
1610860	EPA 1630	1610860-10	WQ_ECH_102616_SW_10	D	Methyl mercury	0.048	J	0.05	U	BL1	NG/L
1610860	EPA 1630	1610860-16	OV-02_102616_SW_10	D	Methyl mercury	0.066		0.066	J	MS-H	NG/L
1610860	EPA 1630	1610860-15	OV-02_102616_SW_10	T	Methyl mercury	0.078		0.078	J	MS-H	NG/L
1610860	EPA 1630	1610860-09	WQ_ECH_102616_SW_10	T	Methyl mercury	0.136		0.136	J	MS-H	NG/L
1610860	EPA 1630	1610860-01	WQ1B-C_102516_SW_10	T	Methyl mercury	0.12		0.12	J	MS-H	NG/L
1610860	EPA 1630	1610860-02	WQ1B-C_102516_SW_10	D	Methyl mercury	0.106		0.106	J	MS-H	NG/L
1610860	EPA 1630	1610860-03	WQ1B-C_102516_SW_10_DUP	T	Methyl mercury	0.157		0.157	J	MS-H	NG/L
1610860	EPA 1630	1610860-04	WQ1B-C_102516_SW_10_DUP	D	Methyl mercury	0.098		0.098	J	MS-H	NG/L
1610860	EPA 1630	1610860-13	WQ2-C_102616_SW_10	T	Methyl mercury	0.124		0.124	J	MS-H	NG/L
1610860	EPA 1630	1610860-14	WQ2-C_102616_SW_10	D	Methyl mercury	0.034	J	0.034	J	MS-H	NG/L
1610860	EPA 1630	1610860-11	WQ3-L_102616_SW_10	T	Methyl mercury	0.113		0.113	J	MS-H	NG/L

Fraction:
D = Dissolved
T = Total

Validation Qualifier:
J = Value is estimated
U = Not detected

Units:
NG/L = nanograms per liter

Validation Reason Codes:
BL1 = Method blank contamination
MS-H = MS and/or MSD recovery high

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TABLE 3
DATA VALIDATION SUMMARY REPORT
OCTOBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610860, L1634797

			Location ID	ES-15		OV-02		WQ-ECH	
			Sample Name	ES-15_102616_SW_10		OV-02_102616_SW_10		WQ_ECH_102616_SW_10	
			Sample Date	10/26/16		10/26/16		10/26/16	
			Sample Type	FS		FS		FS	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.05	U	0.078	J	0.136	J
EPA 1631	Total	Mercury	NG/L	2.35		0.96		8.49	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.066	J	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	0.86		0.62	U	2.17	
2540D	Total	Total Suspended Solids	MG/L	8.2		5	U	12	
9060A	Total	Total Organic Carbon	MG/L	0.5	U	5.3		1	U
9060A	Dissolved	Dissolved Organic Carbon	MG/L	2	U	5.7		2	U

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

TABLE 3
DATA VALIDATION SUMMARY REPORT
OCTOBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610860, L1634797

			Location ID	WQ-FPT		WQ1b-C		WQ1b-C	
			Sample Name	WQ-FPT_102616_SW_10		WQ1B-C_102516_SW_10		WQ1B-C_102516_SW_10_DUP	
			Sample Date	10/26/16		10/25/16		10/25/16	
			Sample Type	FS		FS		FD	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.05	U	0.12	J	0.157	J
EPA 1631	Total	Mercury	NG/L	1.64		4.95		5.64	
EPA 1630	Dissolved	Methyl mercury	NG/L	0.05	U	0.106	J	0.098	J
EPA 1631	Dissolved	Mercury	NG/L	1.25		4.35		4.33	
2540D	Total	Total Suspended Solids	MG/L	8.6		7.2		8.2	
9060A	Total	Total Organic Carbon	MG/L	0.5	U	4.6		4.1	
9060A	Dissolved	Dissolved Organic Carbon	MG/L	2	U	4.6		4.7	

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

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TABLE 3
DATA VALIDATION SUMMARY REPORT
OCTOBER 2016 SURFACE WATER SAMPLING
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING EVALUATION
PENOBSCOT RIVER, MAINE
SDGs 1610860, L1634797

			Location ID	WQ2-C		WQ3-L		QC	
			Sample Name	WQ2-C_102616_SW_10		WQ3-L_102616_SW_10		EB_102616_SW_QC	
			Sample Date	10/26/16		10/26/16		10/26/16	
			Sample Type	FS		FS		EB	
Method	**Fraction**	**Parameter**	**Units**	Result	Qualifier	Result	Qualifier	Result	Qualifier
EPA 1630	Total	Methyl mercury	NG/L	0.124	J	0.113	J	0.05	U
EPA 1631	Total	Mercury	NG/L	5.27		5.42		0.5	U
EPA 1630	Dissolved	Methyl mercury	NG/L	0.034	J	0.05	U	0.05	U
EPA 1631	Dissolved	Mercury	NG/L	1.89		0.95		0.5	U
2540D	Total	Total Suspended Solids	MG/L	10		12			
9060A	Total	Total Organic Carbon	MG/L	1.9		1	U	0.5	U
9060A	Dissolved	Dissolved Organic Carbon	MG/L	1.4		1	U	1	U

Units:
MG/L = milligrams per liter
NG/L = nanograms per liter

Validation Qualifier:
J = Value is estimated
U = Analyte not detected above the reporting limit

Sample Type
FD = Field Duplicate
FS = Field Sample
EB = Equipment Blank

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APPENDIX D
RIVER STAGE AND TURBIDITY DATA

APPENDIX D-1
HISTORICAL U.S. GEOLOGICAL SURVEY EDDINGTON GAGE DATA

APPENDIX D-1
HISTORICAL USGS EDDINGTON GAGE DATA

2016 SEDIMENT AND SURFACE WATER QUALITY MONITORING REPORT
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING STUDY

YEAR	Monthly mean in ft (Calculation Period: 2007-08-01 -> 2013-08-31)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007								2.847	2.891	3.383	6.944	5.064
2008	5.321	4.87	5.989	10.143	8.718	4.709	4.305	5.077	3.665	5.141	6.675	6.957
2009	5.295	4.46	5.265	11.226	5.827	5.489	6.159	4.979	3.333	4.541	5.623	5.906
2010	5.202	4.805	6.996	8.388	4.03	4.061	3.298	2.807	3.386	5.074	7.085	8.736
2011	4.904	4.182	7.031	9.257	9.695	4.915	3.242	4.117	6.454	5.231	4.201	5.06
2012	4.285	3.744	6.27	5.965	6.237	5.869	4.509	3.037	3.295	5.841	6.372	4.821
2013	4.798	4.972	5.304	7.461	6.035	7.304	5.249	4.585				
Mean of monthly Gage height	4.97	4.51	6.14	8.74	6.76	5.39	4.46	3.92	3.84	4.87	6.15	6.09

63680, Turbidity, water, unfiltered, monochrome near infra-red LED light, 780-900 nm, detection angle 90 +-2.5 degrees, formazin nephelometric units (FNU),

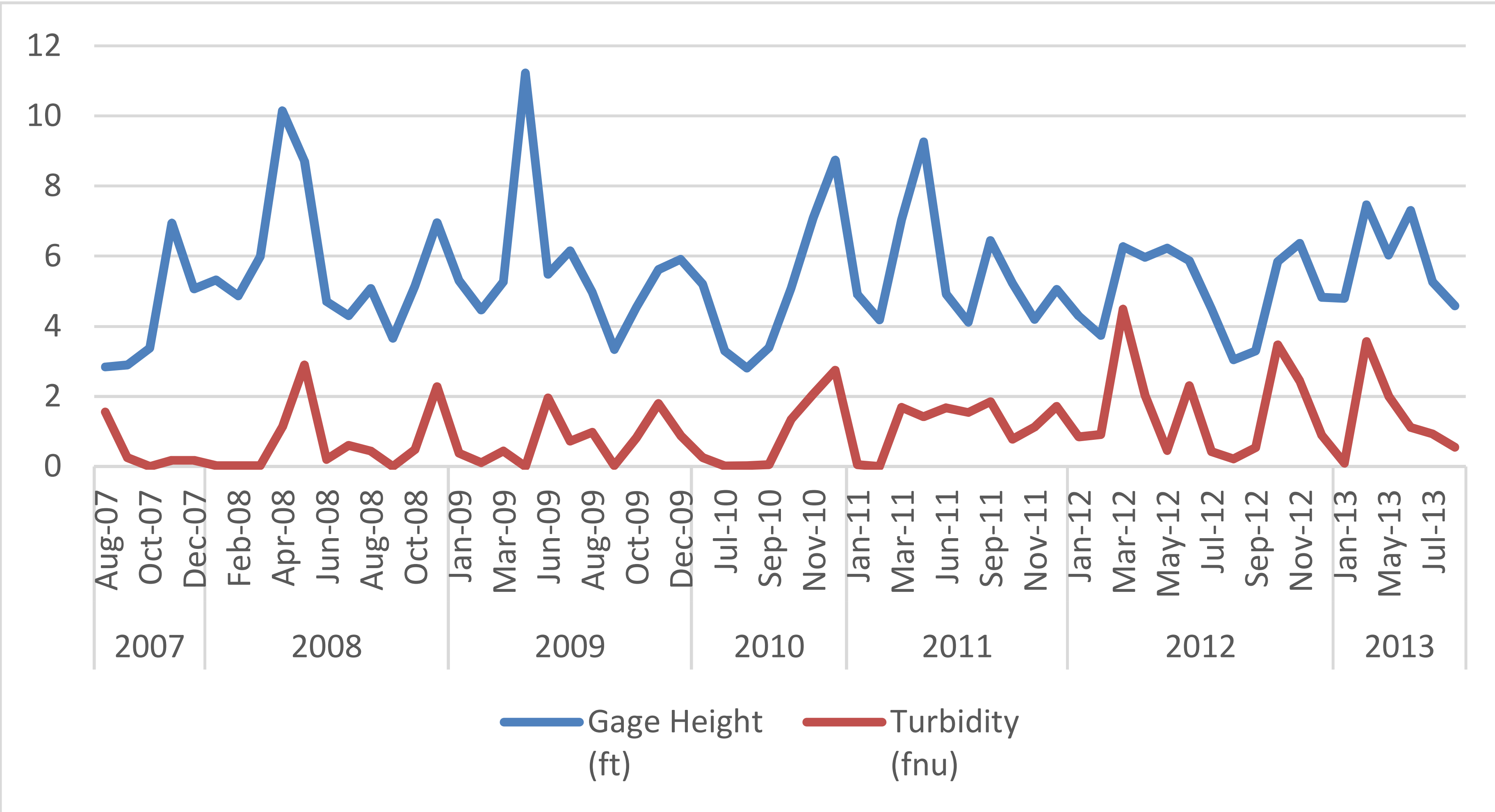
YEAR	Monthly mean in FNU (Calculation Period: 2007-08-01 -> 2013-08-31)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007								1.55	0.26	0	0.17	0.17
2008	0.03	0.02	0.02	1.13	2.9	0.2	0.6	0.44	0	0.48		2.28
2009	0.37	0.11	0.44	0		1.96	0.72	0.98	0.02	0.82	1.8	0.89
2010	0.25						0.01	0.02	0.06	1.34	2.07	2.75
2011	0.06	0	1.69	1.42		1.67		1.54	1.85	0.78	1.13	1.71
2012	0.85	0.91	4.49	2.02	0.45	2.3	0.43	0.22	0.53	3.47	2.44	0.89
2013	0.09			3.56	2.01	1.11	0.93	0.55				
Mean of monthly Turbidity, Form Neph	0.3	0.3	1.7	1.6	1.8	1.4	0.5	0.8	0.5	1.1	1.5	1.4

Data Source
http://waterdata.usgs.gov/usa/nwis/uv?01036390
Latitude 44°49'36", Longitude 68°41'48" NAD83

APPENDIX D-2
HISTORICAL U.S. GEOLOGICAL SURVEY EDDINGTON TURBIDITY DATA

APPENDIX D-2
HISTORICAL USGS EDDINGTON TURBIDITY DATA

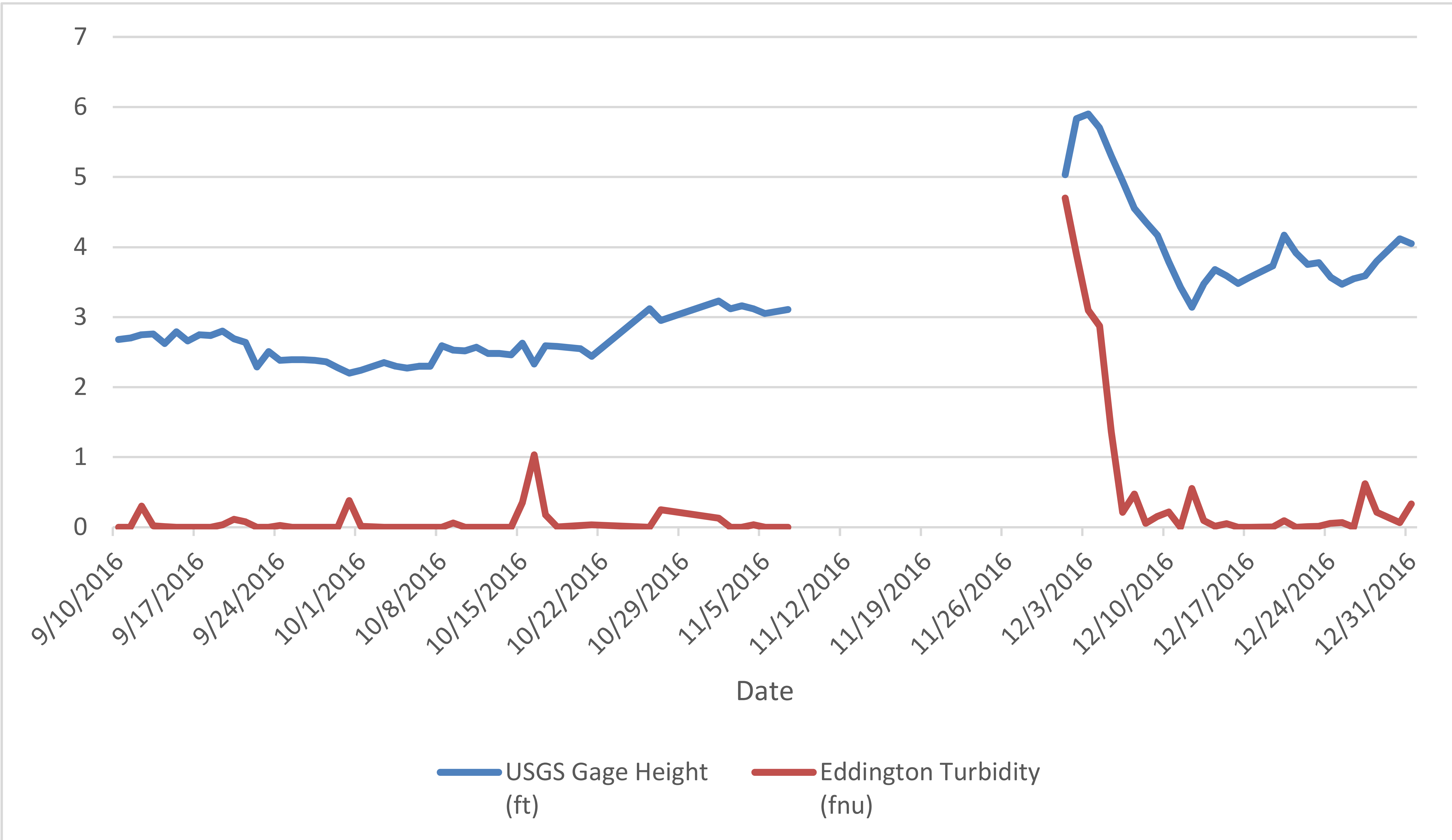
2016 SEDIMENT AND SURFACE WATER MONITORING REPORT
PENOBSCOt RIVER ESTUARY PHASE III - ENGINEERING STUDY



APPENDIX D-3
2016 EDDINGTON BOAT RAMP TURBIDITY DATA

APPENDIX D-2
2016 EDDINGTON BOAT RAMP TURBIDITY DATA

2016 SEDIMENT AND SURFACE WATER QUALITY MONITORING REPORT
PENOBSCOT RIVER ESTUARY PHASE III - ENGINEERING STUDY



USGS Data Source; http://waterdata.usgs.gov/usa/nwis/uv?01036390
AFW Data Source; Eddington Turbidity Meter

APPENDIX E
STATISTICAL ANALYSES

APPENDIX E-1
SEDIMENT DATA USED IN STATISTICAL ANALYSES

Loc	alt_loc	Reach	Sample.da	sample.id	use	top.depth.f	bottom.dep	Total.Orga	Mercury.N(
BA-ES-02-.	ES-02	Verona No	7/9/2007	BA-ES2A					1590
BA-ES-02-	ES-02	Verona No	7/9/2007	BA-ES2B					1740
BA-ES-02-	ES-02	Verona No	7/9/2007	BA-ES2C					1840
BA-ES-02-	ES-02	Verona No	7/9/2007	BA-ES2D					1730
BA-ES-02-	ES-02	Verona No	7/9/2007	BA-ES2E					1450
BA-ES-02-	ES-02	Verona No	7/9/2007	BA-ES2F					1560
E-01-01	E-01-01	Fort Point (	8/17/2007	E01-01-0-3	x	0	0.099	1.4	606
E-01-01	E-01-01	Fort Point (	7/23/2008	E01-01-0-3	x	0	0.099	5.18	864
E-01-01	E-01-01	Fort Point (	8/6/2008	E01-01-0-3	x	0	0.099	4.07	810
E-01-01	E-01-01	Fort Point (	8/20/2008	E01-01-0-3	x	0	0.099	2.19	760
E-01-01	E-01-01	Fort Point (	9/3/2008	E01-01-0-3	x	0	0.099	4.46	830
E-01-01	E-01-01	Fort Point (	9/18/2008	E01-01-0-3	x	0	0.099	5.6	788
E-01-01	E-01-01	Fort Point (	9/30/2008	E01-01	x	0	0.099	5.62	760
E-01-01	E-01-01	Fort Point (	########	E01-01-0-3	x	0	0.099	5.58	777
E-01-01	E-01-01	Fort Point (	5/12/2009	E01-01-0-3	x	0	0.099	5.23	672
E-01-01	E-01-01	Fort Point (	6/2/2009	E01-01-0-3	x	0	0.099	8.24	931
E-01-01	E-01-01	Fort Point (	6/25/2009	E01_01-0-3	x	0	0.099	5.24	654
E-01-01	E-01-01	Fort Point (	7/15/2009	E01_01-0-3	x	0	0.099	5.54	458
E-01-01	E-01-01	Fort Point (	8/5/2009	E01-01-0-3	x	0	0.099	5.35	671
E-01-01	E-01-01	Fort Point (	8/25/2009	PB09-6520-0-3		0	0.099		627
E-01-01	E-01-01	Fort Point (	8/25/2009	PB09-6521-3-6		0.099	0.198		788
E-01-01	E-01-01	Fort Point (	8/25/2009	PB09-6522-6-9		0.198	0.297		778
E-01-01	E-01-01	Fort Point (	8/25/2009	PB09-0-9_	x				731
E-01-01	E-01-01	Fort Point (	9/4/2009	E01-01-0-3	x	0	0.099	4.95	699
E-01-01	E-01-01	Fort Point (	5/26/2010	PB10-8391-0-3		0	0.099		733
E-01-01	E-01-01	Fort Point (	5/26/2010	PB10-8392-3-6		0.099	0.198		790
E-01-01	E-01-01	Fort Point (	5/26/2010	PB10-8393-6-9		0.198	0.297		813
E-01-01	E-01-01	Fort Point (	5/26/2010	PB10-0-9_	x				778.6667
E-01-01	E-01-01	Fort Point (	8/23/2010	E-01-01 0-3	x	0	0.099	4.28333	672
E-01-01	E-01-01	Fort Point (	8/20/2012	E01-1-Surf	x	0	0.099	6.03	755
E-01-01	E-01-01	Fort Point (	8/20/2012	E01-1-Surf	x	0	0.099	6.03	583
E-01-01	E-01-01	Fort Point (	8/20/2012	E01-1-Surf	x	0	0.099	5.93	702
E-01-01	E-01-01	Fort Point (	7/28/2016	E-01-01_0	x	0	0	5.9	1100
E-01-03	E-01-03	Upper Pen	8/17/2007	E01-03-0-3	x	0	0.099	1.3	447
E-01-03	E-01-03	Upper Pen	7/23/2008	E01-03-0-3	x	0	0.099	3.34	369
E-01-03	E-01-03	Upper Pen	8/6/2008	E01-03-0-3	x	0	0.099	4.9	651
E-01-03	E-01-03	Upper Pen	8/20/2008	E01-03-0-3	x	0	0.099	1.79	530
E-01-03	E-01-03	Upper Pen	9/3/2008	E01-03-0-3	x	0	0.099	2.2	564
E-01-03	E-01-03	Upper Pen	9/18/2008	E01-03-0-3	x	0	0.099	2.71	696
E-01-03	E-01-03	Upper Pen	9/30/2008	E01-03	x	0	0.099	2.88	456
E-01-03	E-01-03	Upper Pen	########	E01-03-0-3	x	0	0.099	3.17	462
E-01-03	E-01-03	Upper Pen	5/12/2009	E01-03-0-3	x	0	0.099	2.6	433
E-01-03	E-01-03	Upper Pen	6/3/2009	E01-03-0-3	x	0	0.099		482
E-01-03	E-01-03	Upper Pen	6/25/2009	E01_03-0-3	x	0	0.099	2.8	500
E-01-03	E-01-03	Upper Pen	7/15/2009	E01_03-0-3	x	0	0.099	2.38	360
E-01-03	E-01-03	Upper Pen	8/5/2009	E01-03-0-3	x	0	0.099	2.38	493
E-01-03	E-01-03	Upper Pen	8/25/2009	PB09-6580-0-3		0	0.099		1859
E-01-03	E-01-03	Upper Pen	9/4/2009	E01-03-0-3	x	0	0.099	1.85	403
E-01-03	E-01-03	Upper Pen	5/26/2010	PB10-8432-0-3		0	0.099		514
E-01-03	E-01-03	Upper Pen	8/23/2010	E-01-03 0-3	x	0	0.099	2.85667	576.3333
E-01-03	E-01-03	Upper Pen	8/20/2012	E01-3-Surf	x	0	0.099	3.48	459
E-01-03	E-01-03	Upper Pen	8/20/2012	E01-3-Surf	x	0	0.099	3.41	432
E-01-03	E-01-03	Upper Pen	8/20/2012	E01-3-Surf	x	0	0.099	3.75	522
E-01-03	E-01-03	Upper Pen	7/28/2016	E-01-03_0	x	0	0	3.9	513

E-01-04	E-01-04	Upper Pen	8/17/2007	E01-04-0-3	x	0	0.099	1.5	278
E-01-04	E-01-04	Upper Pen	7/23/2008	E01-04-0-3	x	0	0.099	1.53	268
E-01-04	E-01-04	Upper Pen	8/6/2008	E01-04-0-3	x	0	0.099	4.68	369
E-01-04	E-01-04	Upper Pen	8/20/2008	E01-04-0-3	x	0	0.099	0.678	253
E-01-04	E-01-04	Upper Pen	9/3/2008	E01-04-0-3	x	0	0.099	2.02	324
E-01-04	E-01-04	Upper Pen	9/18/2008	E01-04-0-3	x	0	0.099	2.61	334
E-01-04	E-01-04	Upper Pen	9/30/2008	E01-04	x	0	0.099	2.34	271
E-01-04	E-01-04	Upper Pen	########	E01-04-0-3	x	0	0.099	2.06	244
E-01-04	E-01-04	Upper Pen	5/12/2009	E01-04-0-3	x	0	0.099	2.05	225
E-01-04	E-01-04	Upper Pen	6/3/2009	E01-04-0-3	x	0	0.099	1.97	425
E-01-04	E-01-04	Upper Pen	6/25/2009	E01_04-0-3	x	0	0.099	1.97	286
E-01-04	E-01-04	Upper Pen	7/15/2009	E01_04-0-3	x	0	0.099	1.66	252
E-01-04	E-01-04	Upper Pen	8/5/2009	E01-04-0-3	x	0	0.099	1.63	231
E-01-04	E-01-04	Upper Pen	9/4/2009	E01-04-0-3	x	0	0.099	1.56	289
E-01-04	E-01-04	Upper Pen	8/23/2010	E-01-04 0-3	x	0	0.099	1.87333	293
E-01-04	E-01-04	Upper Pen	8/20/2012	E01-4-Surf	x	0	0.099	2.14	163
E-01-04	E-01-04	Upper Pen	8/20/2012	E01-4-Surf	x	0	0.099	2.33	240
E-01-04	E-01-04	Upper Pen	8/20/2012	E01-4-Surf	x	0	0.099	2.85	313
E-01-04	E-01-04	Upper Pen	7/28/2016	E-01-04_0'	x	0	0	3.3	579
ES-02	ES-02	Verona No	8/1/2006	ES-2 0-1 cm		0	0.033	5.88	950.4
ES-02	ES-02	Verona No	8/1/2006	ES-2 1-2 cm	-1-2	0.033	0.066	7.29	1009
ES-02	ES-02	Verona No	8/1/2006	ES-2 2-3 cm		0.066	0.099	6.815	837.9
ES-02	ES-02	Verona No	8/1/2006	ES-2 3-4 cm		0.099	0.132	5.813	998.4
ES-02	ES-02	Verona No	8/1/2006	ES-2 4-5 cm		0.132	0.165	7.632	843.5
ES-02	ES-02	Verona No	8/1/2006	ES-2 5-6 cm		0.165	0.198	7.519	1035
ES-02	ES-02	Verona No	8/1/2006	ES-2 6-7 cm		0.198	0.231	9.73	1016
ES-02	ES-02	Verona No	8/1/2006	ES-2 7-8 cm		0.231	0.264	7.342	994.1
ES-02	ES-02	Verona No	8/1/2006	ES-2 8-9 cm		0.264	0.297	8.84	1164
ES-02	ES-02	Verona No	8/1/2006	ES-2 9-10 cm		0.297	0.33	6.447	1098
ES-02	ES-02	Verona No	8/1/2006	ES-2 0-10	x			7.3308	994.63
ES-02	ES-02	Verona No	9/6/2006	ES-2 5-6 cm		0.165	0.198	6.0097	1209
ES-02	ES-02	Verona No	9/6/2006	ES-2 6-7 cm		0.198	0.231	6.1166	1201
ES-02	ES-02	Verona No	9/6/2006	ES-2 7-8 cm		0.231	0.264	6.2304	1309
ES-02	ES-02	Verona No	9/6/2006	ES-2 8-9 cm		0.264	0.297	5.8661	1012
ES-02	ES-02	Verona No	9/6/2006	ES-2 9-10 cm		0.297	0.33	5.4653	1178
ES-02	ES-02	Verona No	9/6/2006	ES2 0-1 cm		0	0.033	5.6029	1005
ES-02	ES-02	Verona No	9/6/2006	ES2 1-2 cm		0.033	0.066	5.7708	1005
ES-02	ES-02	Verona No	9/6/2006	ES2 2-3 cm		0.066	0.099	6.8065	1169
ES-02	ES-02	Verona No	9/6/2006	ES2 3-4 cm		0.099	0.132	7.3322	906.9
ES-02	ES-02	Verona No	9/6/2006	ES2 4-5 cm		0.132	0.165	7.1743	1047
ES-02	ES-02	Verona No	9/6/2006	ES2 0-10 c	x			6.23748	1104.19
ES-02	ES-02	Verona No	9/26/2006	ES 2-0-1		0	0.033	4.7441	553.366
ES-02	ES-02	Verona No	9/26/2006	ES 2-1-2		0.033	0.066	6.3218	638.469
ES-02	ES-02	Verona No	9/26/2006	ES 2-2-3		0.066	0.099	9.1037	890.553
ES-02	ES-02	Verona No	9/26/2006	ES 2-3-4		0.099	0.132	8.7933	846.138
ES-02	ES-02	Verona No	9/26/2006	ES 2-4-5		0.132	0.165	8.7007	895.791
ES-02	ES-02	Verona No	9/26/2006	ES 2-5-6		0.165	0.198	9.4587	1700.38
ES-02	ES-02	Verona No	9/26/2006	ES 2-6-7		0.198	0.231	7.0841	1491.08
ES-02	ES-02	Verona No	9/26/2006	ES 2-7-8		0.231	0.264	5.2726	1942.81
ES-02	ES-02	Verona No	9/26/2006	ES 2-8-9		0.264	0.297	7.1313	1745.42
ES-02	ES-02	Verona No	9/26/2006	ES 2-9-10		0.297	0.33	6.9348	1772.96
ES-02	ES-02	Verona No	9/26/2006	ES 2-0-10_	x			7.35451	1247.697
ES-02	ES-02	Verona No	########	ES2-0-1		0	0.033	6.1976	1161.67
ES-02	ES-02	Verona No	########	ES2-1-2		0.033	0.066	6.6861	1508.82
ES-02	ES-02	Verona No	########	ES2-2-3		0.066	0.099	6.5674	1454.2

ES-02	ES-02	Verona No	########	ES2-3-4		0.099	0.132	6.4997	1312.83
ES-02	ES-02	Verona No	########	ES2-4-5		0.132	0.165	4.2299	1297.04
ES-02	ES-02	Verona No	########	ES2-5-6		0.165	0.198	6.7475	1378.52
ES-02	ES-02	Verona No	########	ES2-6-7		0.198	0.231	6.3822	1376.3
ES-02	ES-02	Verona No	########	ES2-7-8		0.231	0.264	7.1433	1366.95
ES-02	ES-02	Verona No	########	ES2-8-9		0.264	0.297	7.1616	1350.8
ES-02	ES-02	Verona No	########	ES2-9-10		0.297	0.33	7.9104	1353.37
ES-02	ES-02	Verona No	########	ES2-0-10_	x			6.55257	1356.05
ES-02	ES-02	Verona No	6/1/2007	ES02-0-1 cm		0	0.033	6	909.612
ES-02	ES-02	Verona No	6/1/2007	ES02-1-2 cm		0.033	0.066	6.57	1021.04
ES-02	ES-02	Verona No	6/1/2007	ES02-2-3 cm		0.066	0.099	6.43	1014.74
ES-02	ES-02	Verona No	6/1/2007	ES02-3-4 cm		0.099	0.132	6.99	1098.73
ES-02	ES-02	Verona No	6/1/2007	ES02-4-5 cm		0.132	0.165	6.49	1370.14
ES-02	ES-02	Verona No	6/1/2007	ES02-5-6 cm		0.165	0.198	6.7	1167.86
ES-02	ES-02	Verona No	6/1/2007	ES02-6-7 cm		0.198	0.231	7.26	1089.03
ES-02	ES-02	Verona No	6/1/2007	ES02-7-8 cm		0.231	0.264	7.18	1207.92
ES-02	ES-02	Verona No	6/1/2007	ES02-8-9 cm		0.264	0.297	7.52	1234.7
ES-02	ES-02	Verona No	6/1/2007	ES02-9-10 cm		0.297	0.33	8.08	1161.37
ES-02	ES-02	Verona No	6/1/2007	ES02-0-10	x			6.922	1127.514
ES-02	ES-02	Verona No	7/9/2007	ES02-0-1 cm		0	0.033	6.58	959.357
ES-02	ES-02	Verona No	7/9/2007	ES02-1-2 cm		0.033	0.066	6.36	1107.15
ES-02	ES-02	Verona No	7/9/2007	ES02-2-3 cm		0.066	0.099	6.75	1110.59
ES-02	ES-02	Verona No	7/9/2007	ES02-3-4 cm		0.099	0.132	6.84	1341.22
ES-02	ES-02	Verona No	7/9/2007	ES02-4-5 cm		0.132	0.165	7.95	1527.2
ES-02	ES-02	Verona No	7/9/2007	ES02-5-6 cm		0.165	0.198	7.72	1528
ES-02	ES-02	Verona No	7/9/2007	ES02-6-7 cm		0.198	0.231	8.03	1667.3
ES-02	ES-02	Verona No	7/9/2007	ES02-7-8 cm		0.231	0.264	7.75	1908.66
ES-02	ES-02	Verona No	7/9/2007	ES02-8-9 cm		0.264	0.297	8.08	1960.6
ES-02	ES-02	Verona No	7/9/2007	ES02-9-10 cm		0.297	0.33	8.21	2247.26
ES-02	ES-02	Verona No	7/9/2007	ES02-0-10	x			7.427	1535.734
ES-02	ES-02	Verona No	8/22/2012	ES02-Inter	x	0	0.099	7.27	823
ES-02	ES-02	Verona No	8/22/2012	ES02-Inter	x	0	0.099	6.64	1000
ES-02	ES-02	Verona No	8/22/2012	ES02-Inter	x	0	0.099	7.53	1080
ES-02	ES-02	Verona No	8/22/2012	ES02-Inter	x	0	0.099	7.15	1020
ES-02	ES-02	Verona No	8/22/2012	ES02-Inter	x	0	0.099	6.8	986
ES-02	ES-02	Verona No	7/27/2016	ES-02_072	x	0	0	7.365	849
ES-02-A	ES-02	Verona No	7/10/2007	2007FR ES2A					
ES-02-B	ES-02	Verona No	7/10/2007	2007FR ES2B					
ES-02-BA-	ES-02	Verona No	3/3/2008	ES2 BA-1		0	0.099		863
ES-02-C	ES-02	Verona No	7/10/2007	2007FR ES2C					
ES-02-D	ES-02	Verona No	7/10/2007	2007FR ES2D					
ES-02-F	ES-02	Verona No	7/10/2007	2007FR ES2F					
ES-02-Inte	ES-02	Verona No	8/26/2010	ES-02-Inte	x	0	0.099	4.272	780.2
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 0-1 cm		0	0.033	9.672	692.3
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 1-2 cm		0.033	0.066	3.546	726.7
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 2-3 cm		0.066	0.099	3.764	717.1
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 3-4 cm		0.099	0.132	3.537	578.5
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 4-5 cm		0.132	0.165	3.648	381.8
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 5-6 cm		0.165	0.198	4.268	461.5
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 6-7 cm		0.198	0.231	4.284	461.4
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 7-8 cm		0.231	0.264	2.429	108.8
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 8-9 cm		0.264	0.297	1.978	87.26
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 9-10 cm		0.297	0.33	3.218	85.86
ES-13	ES-13	Verona Ea	8/4/2006	ES-13 0-1(	x			4.0344	430.122
ES-13	ES-13	Verona Ea	9/6/2006	ES13 0-1 cm		0	0.033	8.5061	1041

ES-13	ES-13	Verona Ea:	9/6/2006	ES13 1-2 cm		0.033	0.066	11.2138	434.4
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 2-3 cm		0.066	0.099	8.4799	603.7
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 3-4 cm		0.099	0.132	7.614	534.4
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 4-5 cm		0.132	0.165	3.4256	273.6
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 5-6 cm		0.165	0.198	2.4543	459.3
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 6-7 cm		0.198	0.231	2.7285	341.7
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 7-8 cm		0.231	0.264	3.3112	567.1
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 8-9 cm		0.264	0.297	2.379	482.7
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 9-10 cm		0.297	0.33	2.8329	336.6
ES-13	ES-13	Verona Ea:	9/6/2006	ES13 0-10	x			5.29453	507.45
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-0-1		0	0.033	5.797	917.116
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-1-2		0.033	0.066	8.1359	512.902
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-2-3		0.066	0.099	9.7004	490.375
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-3-4		0.099	0.132	10.1155	490.735
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-4-5		0.132	0.165	8.9547	467.752
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-5-6		0.165	0.198	8.2119	401.139
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-6-7		0.198	0.231	6.7576	415.842
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-7-8		0.231	0.264	3.9558	449.902
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-8-9		0.264	0.297	3.9558	398.671
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-9-10		0.297	0.33	4.1832	477.778
ES-13	ES-13	Verona Ea:	9/26/2006	ES 13-0-1(	x			6.97678	502.2212
ES-13	ES-13	Verona Ea:	########	ES13-0-1		0	0.033	7.1159	984.024
ES-13	ES-13	Verona Ea:	########	ES13-1-2		0.033	0.066	6.9844	1045.22
ES-13	ES-13	Verona Ea:	########	ES13-2-3		0.066	0.099	7.6335	1234.53
ES-13	ES-13	Verona Ea:	########	ES13-3-4		0.099	0.132	9.8381	1402.52
ES-13	ES-13	Verona Ea:	########	ES13-4-5		0.132	0.165	9.3856	1393.64
ES-13	ES-13	Verona Ea:	########	ES13-5-6		0.165	0.198	8.4878	1396.84
ES-13	ES-13	Verona Ea:	########	ES13-6-7		0.198	0.231	7.9354	1325.89
ES-13	ES-13	Verona Ea:	########	ES13-7-8		0.231	0.264	7.1458	1224.91
ES-13	ES-13	Verona Ea:	########	ES13-8-9		0.264	0.297	7.7642	1295.28
ES-13	ES-13	Verona Ea:	########	ES13-9-10		0.297	0.33	8.7746	1457.04
ES-13	ES-13	Verona Ea:	########	ES13-0-10	x			8.10653	1275.989
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-0-1 cm		0	0.033	10.5	1103.97
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-1-2 cm		0.033	0.066	6.69	1119.8
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-2-3 cm		0.066	0.099	6.98	785.54
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-3-4 cm		0.099	0.132	3.8	501.982
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-4-5 cm		0.132	0.165	3.63	608.516
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-5-6 cm		0.165	0.198	3.55	538.905
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-6-7 cm		0.198	0.231	2.66	511.286
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-7-8 cm		0.231	0.264	2.7	344.167
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-8-9 cm		0.264	0.297	3.15	552.057
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-9-10 cm		0.297	0.33	3.39	597.052
ES-13	ES-13	Verona Ea:	6/1/2007	ES13-0-10	x			4.705	666.3275
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-0-1 cm		0	0.033	7.28221	1066.34
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-1-2 cm		0.033	0.066	6.06505	1929.39
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-2-3 cm		0.066	0.099	4.63812	723.087
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-3-4 cm		0.099	0.132	2.23294	366.516
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-4-5 cm		0.132	0.165	2.56602	395.346
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-5-6 cm		0.165	0.198	2.47656	364.923
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-6-7 cm		0.198	0.231	2.12884	303.496
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-7-8 cm		0.231	0.264	2.5045	332.495
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-8-9 cm		0.264	0.297	2.457	399.588
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-9-10 cm		0.297	0.33	2.16825	373.937
ES-13	ES-13	Verona Ea:	7/10/2007	ES13-0-10	x			3.451949	625.5118
ES-13	ES-13	Verona Ea:	8/23/2012	ES13-Inter	x	0	0.099	4.2	432

ES-13	ES-13	Verona Ea:	8/23/2012	ES13-Inter	x	0	0.099	0.84	188
ES-13	ES-13	Verona Ea:	8/23/2012	ES13-Inter	x	0	0.099	0.96	169
ES-13	ES-13	Verona Ea:	8/23/2012	ES13-Inter	x	0	0.099	1.29	238
ES-13	ES-13	Verona Ea:	8/23/2012	ES13-Inter	x	0	0.099	1.31	190
ES-13	ES-13	Verona Ea:	7/27/2016	ES-13_072	x	0	0	2.96	395
ES-13-Inte	ES-13	Verona Ea:	8/26/2010	ES13-Inter	x	0	0.099	18.4	2310
ES-13-Inte	ES-13	Verona Ea:	8/26/2010	ES13-Inter	x	0	0.099	11.1	1640
ES-13-Inte	ES-13	Verona Ea:	8/26/2010	ES13-Inter	x	0	0.099	8.97	1550
ES-13-Inte	ES-13	Verona Ea:	8/26/2010	ES13-Inter	x	0	0.099	5.97	1710
ES-13-Inte	ES-13	Verona Ea:	8/26/2010	ES13-Inter	x	0	0.099	8.51	1550
OV-01	OV-01	Veazie	8/1/2006	OV-1-0-3	x	0	0.099	0.6491	11.49
OV-01	OV-01	Veazie	9/10/2006	OV-1 0-3 c	x	0	0.099	2.3676	43.44
OV-01	OV-01	Veazie	10/1/2006	OV 1-0-3	x	0	0.099	0.7515	27.74815
OV-01	OV-01	Veazie	########	OV-1 core 1-0-3		0	0.099	0.4524	23.95
OV-01	OV-01	Veazie	########	OV-1 core 2-0-3		0	0.099	0.6454	17.9
OV-01	OV-01	Veazie	########	OV-1 core	x			0.5489	20.925
OV-01	OV-01	Veazie	5/31/2007	OV1 -0-3 c	x	0	0.099	0.6195	19.61317
OV-01	OV-01	Veazie	7/11/2007	OV1 -0-3 c	x	0	0.099	0.92	21.4
OV-01	OV-01	Veazie	8/20/2012	OV1-Interti	x	0	0.099	0.76	20.3
OV-01	OV-01	Veazie	8/20/2012	OV1-Interti	x	0	0.099	0.83	19.1
OV-01	OV-01	Veazie	8/20/2012	OV1-Interti	x	0	0.099	0.95	17.8
OV-01	OV-01	Veazie	8/20/2012	OV1-Interti	x	0	0.099	0.7	17.1
OV-01	OV-01	Veazie	8/20/2012	OV1-Interti	x	0	0.099	0.84	17.8
OV-01	OV-01	Veazie	7/22/2016	OV-01_072	x	0	0	0.367	29.3
OV-01-Inte	OV-01	Veazie	8/24/2010	OV-01-Inte	x	0	0.099	1.28	21.844
OV-02	OV-02	Veazie	8/1/2006	OV-2-0-3	x	0	0.099	2.4201	34.57
OV-02	OV-02	Veazie	9/10/2006	OV-2 0-3 c	x	0	0.099	2.211	76.34
OV-02	OV-02	Veazie	10/1/2006	OV 2-0-3	x	0	0.099	1.7775	61.6718
OV-02	OV-02	Veazie	########	OV-2-0-1		0	0.033	4.3498	88.4713
OV-02	OV-02	Veazie	########	OV-2-1-2		0.033	0.066	4.6898	89.9169
OV-02	OV-02	Veazie	########	OV-2-2-3		0.066	0.099	7.8217	83.2751
OV-02	OV-02	Veazie	########	OV-2-3-4		0.099	0.132	7.4658	99.0765
OV-02	OV-02	Veazie	########	OV-2-4-5		0.132	0.165	3.8285	135.015
OV-02	OV-02	Veazie	########	OV-2-5-6		0.165	0.198	4.0993	140.383
OV-02	OV-02	Veazie	########	OV-2-6-7		0.198	0.231	3.5134	196.223
OV-02	OV-02	Veazie	########	OV-2-7-8		0.231	0.264	3.6063	150.294
OV-02	OV-02	Veazie	########	OV-2-8-9		0.264	0.297	4.6464	113.213
OV-02	OV-02	Veazie	########	OV-2-9-10		0.297	0.33	6.6831	168.811
OV-02	OV-02	Veazie	########	OV-2-0-10_	x			5.07041	126.4679
OV-02	OV-02	Veazie	5/31/2007	OV2 -0-1 cm		0	0.033	2.45	50.9251
OV-02	OV-02	Veazie	5/31/2007	OV2 -1-2 cm		0.033	0.066	2.51	86.5084
OV-02	OV-02	Veazie	5/31/2007	OV2 -2-3 cm		0.066	0.099	4.1	91.7971
OV-02	OV-02	Veazie	5/31/2007	OV2 -3-4 cm		0.099	0.132	5.04	62.2945
OV-02	OV-02	Veazie	5/31/2007	OV2 -4-5 cm		0.132	0.165	1.3	60.3834
OV-02	OV-02	Veazie	5/31/2007	OV2 -5-6 cm		0.165	0.198	0.637	61.1418
OV-02	OV-02	Veazie	5/31/2007	OV2 -6-7 cm		0.198	0.231	0.832	56.1176
OV-02	OV-02	Veazie	5/31/2007	OV2 -8-9 cm		0.264	0.297	2.62	186.03
OV-02	OV-02	Veazie	5/31/2007	OV2 -9-10 cm		0.297	0.33	1.07	107.189
OV-02	OV-02	Veazie	5/31/2007	OV2-7-8		0.231	0.264	1.47	65.3289
OV-02	OV-02	Veazie	5/31/2007	OV2-0-10_	x			2.2029	82.77158
OV-02	OV-02	Veazie	7/11/2007	OV2 -0-1 cm		0	0.033	1.41	44.5
OV-02	OV-02	Veazie	7/11/2007	OV2 -1-2 cm		0.033	0.066	1.92	59.4
OV-02	OV-02	Veazie	7/11/2007	OV2 -2-3 cm		0.066	0.099	2.18	72.9
OV-02	OV-02	Veazie	7/11/2007	OV2 -3-4 cm		0.099	0.132	2.41	75.3
OV-02	OV-02	Veazie	7/11/2007	OV2 -4-5 cm		0.132	0.165	1.51	76.1

OV-02	OV-02	Veazie	7/11/2007	OV2 -5-6 cm		0.165	0.198	1.31	84.2
OV-02	OV-02	Veazie	7/11/2007	OV2 -6-7 cm		0.198	0.231	1.96	102.2
OV-02	OV-02	Veazie	7/11/2007	OV2 -7-8 cm		0.231	0.264	1.46	91.2
OV-02	OV-02	Veazie	7/11/2007	OV2 -8-9 cm		0.264	0.297	0.64	67.3
OV-02	OV-02	Veazie	7/11/2007	OV2 -9-10 cm		0.297	0.33	0.22	37.4
OV-02	OV-02	Veazie	7/11/2007	OV2 -0-10	x			1.502	71.05
OV-02	OV-02	Veazie	8/20/2012	OV2-Interti	x	0	0.099	0.7	33.1
OV-02	OV-02	Veazie	8/20/2012	OV2-Interti	x	0	0.099	0.43	25.7
OV-02	OV-02	Veazie	8/20/2012	OV2-Interti	x	0	0.099	0.77	24.6
OV-02	OV-02	Veazie	8/20/2012	OV2-Interti	x	0	0.099	1.19	28.3
OV-02	OV-02	Veazie	8/20/2012	OV2-Interti	x	0	0.099	1.37	28.2
OV-02	OV-02	Veazie	7/22/2016	OV-02_072	x	0	0	4.37	46.5
OV-04	OV-04	Veazie	8/1/2006	OV-4 0-1 cm		0	0.033	14.5923	10.54
OV-04	OV-04	Veazie	8/1/2006	OV-4 1-2 cm		0.033	0.066	16.9307	116.4
OV-04	OV-04	Veazie	8/1/2006	OV-4 2-3 cm		0.066	0.099	19.3904	29.22
OV-04	OV-04	Veazie	8/1/2006	OV-4 3-4 cm		0.099	0.132	19.8121	298.7
OV-04	OV-04	Veazie	8/1/2006	OV-4 4-5 cm		0.132	0.165	33.8414	161.6
OV-04	OV-04	Veazie	8/1/2006	OV-4 5-6 cm		0.165	0.198	33.5282	228.2
OV-04	OV-04	Veazie	8/1/2006	OV-4 6-7 cm		0.198	0.231	28.9454	144.4
OV-04	OV-04	Veazie	8/1/2006	OV-4 7-8 cm		0.231	0.264	27.2527	165
OV-04	OV-04	Veazie	8/1/2006	OV-4 8-9 cm		0.264	0.297	22.1382	185.2
OV-04	OV-04	Veazie	8/1/2006	OV-4 9-10 cm		0.297	0.33	19.5963	130.4
OV-04	OV-04	Veazie	8/1/2006	OV-4 0-10	x			23.60277	146.966
OV-04	OV-04	Veazie	9/10/2006	OV-4 0-1 cm		0	0.033	8.2077	128.142
OV-04	OV-04	Veazie	9/10/2006	OV-4 1-2 cm		0.033	0.066	9.3314	196.366
OV-04	OV-04	Veazie	9/10/2006	OV-4 2-3 cm		0.066	0.099	9.7362	176.268
OV-04	OV-04	Veazie	9/10/2006	OV-4 3-4 cm		0.099	0.132	11.0026	191.078
OV-04	OV-04	Veazie	9/10/2006	OV-4 4-5 cm		0.132	0.165	11.7522	200.122
OV-04	OV-04	Veazie	9/10/2006	OV-4 5-6 cm		0.165	0.198	12.1516	136.874
OV-04	OV-04	Veazie	9/10/2006	OV-4 6-7 cm		0.198	0.231	10.7412	189.398
OV-04	OV-04	Veazie	9/10/2006	OV-4 7-8 cm		0.231	0.264	10.5951	186.966
OV-04	OV-04	Veazie	9/10/2006	OV-4 8-9 cm		0.264	0.297	12.0079	134.953
OV-04	OV-04	Veazie	9/10/2006	OV-4 9-10 cm		0.297	0.33	12.749	137.419
OV-04	OV-04	Veazie	9/10/2006	OV-4 0-10	x			10.82749	167.7586
OV-04	OV-04	Veazie	10/1/2006	OV 4-0-1		0	0.033	10.4526	258.093
OV-04	OV-04	Veazie	10/1/2006	OV 4-1-2		0.033	0.066	10.052	259.547
OV-04	OV-04	Veazie	10/1/2006	OV 4-2-3		0.066	0.099	8.534	410.431
OV-04	OV-04	Veazie	10/1/2006	OV 4-3-4		0.099	0.132	9.1411	469.524
OV-04	OV-04	Veazie	10/1/2006	OV 4-4-5		0.132	0.165	8.9339	501.69
OV-04	OV-04	Veazie	10/1/2006	OV 4-5-6		0.165	0.198	7.7752	481.861
OV-04	OV-04	Veazie	10/1/2006	OV 4-6-7		0.198	0.231	10.649	450.667
OV-04	OV-04	Veazie	10/1/2006	OV 4-7-8		0.231	0.264	12.5127	879.87
OV-04	OV-04	Veazie	10/1/2006	OV 4-8-9		0.264	0.297	14.7982	514.653
OV-04	OV-04	Veazie	10/1/2006	OV 4-9-10		0.297	0.33	15.6105	703.002
OV-04	OV-04	Veazie	10/1/2006	OV 4-0-10_	x			10.84592	492.9338
OV-04	OV-04	Veazie	########	OV-4-0-1		0	0.033	13.9092	237.466
OV-04	OV-04	Veazie	########	OV-4-1-2		0.033	0.066	11.471	180.752
OV-04	OV-04	Veazie	########	OV-4-2-3		0.066	0.099	11.3438	321.247
OV-04	OV-04	Veazie	########	OV-4-3-4		0.099	0.132	19.1331	281.734
OV-04	OV-04	Veazie	########	OV-4-4-5		0.132	0.165	11.3893	177.262
OV-04	OV-04	Veazie	########	OV-4-5-6		0.165	0.198	18.7943	255.042
OV-04	OV-04	Veazie	########	OV-4-6-7		0.198	0.231	12.3733	205.16
OV-04	OV-04	Veazie	########	OV-4-7-8		0.231	0.264	12.3337	228.68
OV-04	OV-04	Veazie	########	OV-4-8-9		0.264	0.297	13.7741	250.615
OV-04	OV-04	Veazie	########	OV-4-9-10		0.297	0.33	12.0143	240.699

OV-04	OV-04	Veazie	########	OV-4-0-10_	x			13.65361	237.8657
OV-04	OV-04	Veazie	5/31/2007	OV4 -0-1 cm		0	0.033	12.1	283.24
OV-04	OV-04	Veazie	5/31/2007	OV4 -1-2 cm		0.033	0.066	10.2	352.09
OV-04	OV-04	Veazie	5/31/2007	OV4 -2-3 cm		0.066	0.099	9.81	283.291
OV-04	OV-04	Veazie	5/31/2007	OV4 -3-4 cm		0.099	0.132	9.64	260.51
OV-04	OV-04	Veazie	5/31/2007	OV4 -4-5 cm		0.132	0.165	9.49	246.039
OV-04	OV-04	Veazie	5/31/2007	OV4 -5-6 cm		0.165	0.198	9.94	300.804
OV-04	OV-04	Veazie	5/31/2007	OV4 -6-7 cm		0.198	0.231	10.8	264.914
OV-04	OV-04	Veazie	5/31/2007	OV4 -7-8 cm		0.231	0.264	9.53	301.945
OV-04	OV-04	Veazie	5/31/2007	OV4 -8-9 cm		0.264	0.297	11.1	267.822
OV-04	OV-04	Veazie	5/31/2007	OV4 -9-10 cm		0.297	0.33	12.3	263.122
OV-04	OV-04	Veazie	5/31/2007	OV4 -0-10	x			10.491	282.3777
OV-04	OV-04	Veazie	7/11/2007	OV4 -0-1 cm		0	0.033	12.15	347
OV-04	OV-04	Veazie	7/11/2007	OV4 -1-2 cm		0.033	0.066	9.5	324
OV-04	OV-04	Veazie	7/11/2007	OV4 -2-3 cm		0.066	0.099	9.95	286
OV-04	OV-04	Veazie	7/11/2007	OV4 -3-4 cm		0.099	0.132	9.95	280
OV-04	OV-04	Veazie	7/11/2007	OV4 -4-5 cm		0.132	0.165	9.21	346
OV-04	OV-04	Veazie	7/11/2007	OV4 -5-6 cm		0.165	0.198	8.35	346
OV-04	OV-04	Veazie	7/11/2007	OV4 -6-7 cm		0.198	0.231	8.66	277
OV-04	OV-04	Veazie	7/11/2007	OV4 -7-8 cm		0.231	0.264	8.75	330
OV-04	OV-04	Veazie	7/11/2007	OV4 -8-9 cm		0.264	0.297	8.52	244
OV-04	OV-04	Veazie	7/11/2007	OV4 -9-10 cm		0.297	0.33	8.41	274
OV-04	OV-04	Veazie	7/11/2007	OV4 -0-10	x			9.345	305.4
OV-04	OV-04	Veazie	8/21/2012	OV4-Interti	x	0	0.099	8.88	161
OV-04	OV-04	Veazie	8/21/2012	OV4-Interti	x	0	0.099	8.07	120
OV-04	OV-04	Veazie	8/21/2012	OV4-Interti	x	0	0.099	7.29	113
OV-04	OV-04	Veazie	8/21/2012	OV4-Interti	x	0	0.099	9.75	126
OV-04	OV-04	Veazie	8/21/2012	OV4-Interti	x	0	0.099	8	102
OV-04	OV-04	Veazie	7/22/2016	OV-04_072	x	0	0	0.438	31.1
OV-04-Inte	OV-04	Veazie	8/26/2010	OV-04-Inte	x	0	0.099	5.734	146.6
W-17-High	W-17_High	Frankfort F	7/21/2016	W-17-HIGH	x			8.515	962
W-17-Inter	W-17-Inter	Frankfort F	8/18/2007	W17-Interti	x	0	0.099	12.24	1400
W-17-Inter	W-17-Inter	Frankfort F	7/22/2008	W17-Interti	x	0	0.099	18.33	507
W-17-Inter	W-17-Inter	Frankfort F	8/4/2008	W17-INTEI	x	0	0.099	10.82	872
W-17-Inter	W-17-Inter	Frankfort F	8/20/2008	W17-Interti	x	0	0.099	11.54	906
W-17-Inter	W-17-Inter	Frankfort F	9/3/2008	W17-Interti	x	0	0.099	16.67	932
W-17-Inter	W-17-Inter	Frankfort F	9/18/2008	W17-Interti	x	0	0.099	6.51	790
W-17-Inter	W-17-Inter	Frankfort F	9/30/2008	W17 Interti	x	0	0.099	7.49	628
W-17-Inter	W-17-Inter	Frankfort F	########	W17-INTEI	x	0	0.099	7.67	882
W-17-Inter	W-17-Inter	Frankfort F	5/12/2009	W17-INTEI	x	0	0.099	3.88	658
W-17-Inter	W-17-Inter	Frankfort F	6/2/2009	W17-INTEI	x	0	0.099	4.98	708
W-17-Inter	W-17-Inter	Frankfort F	6/24/2009	W17-Interti	x	0	0.099	4.84	1290
W-17-Inter	W-17-Inter	Frankfort F	7/15/2009	W17-Interti	x	0	0.099	3.13	752
W-17-Inter	W-17-Inter	Frankfort F	8/4/2009	W17-Interti	x	0	0.099	5.24	1440
W-17-Inter	W-17-Inter	Frankfort F	8/11/2009	PB09-5480-0-3		0	0.099		566
W-17-Inter	W-17-Inter	Frankfort F	8/11/2009	PB09-5481-3-6		0.099	0.198		805
W-17-Inter	W-17-Inter	Frankfort F	8/11/2009	PB09-5482-6-9		0.198	0.297		877
W-17-Inter	W-17-Inter	Frankfort F	8/11/2009	PB09-5483-9-12		0.297	0.396		859
W-17-Inter	W-17-Inter	Frankfort F	8/11/2009	PB09-0-12	x				776.75
W-17-Inter	W-17-Inter	Frankfort F	9/2/2009	W17-Interti	x	0	0.099	4.43	2670
W-17-Inter	W-17-Inter	Frankfort F	8/24/2010	W-17-Inter	x	0	0.099	3.2575	774.25
W-17-Inter	W-17-Inter	Frankfort F	7/26/2016	W-17-INTE	x	0	0	1.655	374
W-17-Inter	W-17-Inter	Frankfort F	8/22/2012	W17-Interti	x	0	0.099	4.71	664
W-17-Inter	W-17-Inter	Frankfort F	8/22/2012	W17-Interti	x	0	0.099	4.37	524
W-17-Inter	W-17-Inter	Frankfort F	8/22/2012	W17-Interti	x	0	0.099	4.95	567

W-17-Interi	W-17-Interi	Frankfort F	8/22/2012	W17-Interti	x	0	0.099	4.73	609
W-17-Low	W-17-Low	Frankfort F	8/18/2007	W17-Low-(	x	0	0.099	11.76	1230
W-17-Low	W-17-Low	Frankfort F	7/22/2008	W17-Low-(	x	0	0.099	6.79	413
W-17-Low	W-17-Low	Frankfort F	8/4/2008	W17-LOW-	x	0	0.099	13.75	1540
W-17-Low	W-17-Low	Frankfort F	8/20/2008	W17-Low-(	x	0	0.099	19.36	996
W-17-Low	W-17-Low	Frankfort F	9/3/2008	W17-Low-(	x	0	0.099	17.12	908
W-17-Low	W-17-Low	Frankfort F	9/18/2008	W17-Low-(	x	0	0.099	16.45	1220
W-17-Low	W-17-Low	Frankfort F	9/30/2008	W17 Low	x	0	0.099	16.09	1050
W-17-Low	W-17-Low	Frankfort F	########	W17-LOW-	x	0	0.099	19.18	1060
W-17-Low	W-17-Low	Frankfort F	5/12/2009	W17-LOW-	x	0	0.099	7.89	305
W-17-Low	W-17-Low	Frankfort F	6/2/2009	W17-LOW-	x	0	0.099	4.86	785
W-17-Low	W-17-Low	Frankfort F	6/24/2009	W17-Low	x	0	0.099	9.98	1410
W-17-Low	W-17-Low	Frankfort F	7/15/2009	W17 Low	x	0	0.099	7.22	565
W-17-Low	W-17-Low	Frankfort F	8/4/2009	W17-Low-(	x	0	0.099	3.16	566
W-17-Low	W-17-Low	Frankfort F	8/13/2009	PB09-5540-0-3		0	0.099		689
W-17-Low	W-17-Low	Frankfort F	8/13/2009	PB09-5541-3-6		0.099	0.198		436
W-17-Low	W-17-Low	Frankfort F	8/13/2009	PB09-5542-6-9		0.198	0.297		466
W-17-Low	W-17-Low	Frankfort F	8/13/2009	PB09-5543-9-12		0.297	0.396		377
W-17-Low	W-17-Low	Frankfort F	8/13/2009	PB09-0-12_	x				492
W-17-Low	W-17-Low	Frankfort F	9/2/2009	W17-Low-(	x	0	0.099	10.5	2510
W-17-Low	W-17-Low	Frankfort F	6/3/2010	PB10-8145-0-3		0	0.099		849
W-17-Low	W-17-Low	Frankfort F	6/3/2010	PB10-8146-3-6		0.099	0.198		324
W-17-Low	W-17-Low	Frankfort F	6/3/2010	PB10-8147-6-9		0.198	0.297		213
W-17-Low	W-17-Low	Frankfort F	6/3/2010	PB10-0-9_	x				462
W-17-Low	W-17-Low	Frankfort F	8/24/2010	W-17-Low	x	0	0.099	6.3475	1405.25
W-17-Low	W-17-Low	Frankfort F	7/26/2016	W-17-LOW	x	0	0	2.565	364
W-17-Low-	W-17-Low	Frankfort F	8/22/2012	W17-Low-/	x	0	0.099	9.19	866
W-17-Low-	W-17-Low	Frankfort F	8/22/2012	W17-Low-E	x	0	0.099	11.3	933
W-17-Low-	W-17-Low	Frankfort F	8/22/2012	W17-Low-(	x	0	0.099	10.2	915
W-17-Low-	W-17-Low	Frankfort F	8/22/2012	W17-Low-I	x	0	0.099	11.1	1000
W-17-Mid (	W-17-Mid	Frankfort F	7/21/2016	W-17-MID_	x			4.86	699
W-21-High	W-21-High	Mendall Ma	8/22/2007	W21-High-	x	0	0.099	4.8	779
W-21-High	W-21-High	Mendall Ma	7/23/2008	W21-High-	x	0	0.099	11.5	873
W-21-High	W-21-High	Mendall Ma	8/5/2008	W21-HIGH	x	0	0.099	19.2	595
W-21-High	W-21-High	Mendall Ma	8/20/2008	W21-High-	x	0	0.099	12.9	755
W-21-High	W-21-High	Mendall Ma	9/3/2008	W21-High-	x	0	0.099	10.7	654
W-21-High	W-21-High	Mendall Ma	9/18/2008	W21-High-	x	0	0.099	13.6	608
W-21-High	W-21-High	Mendall Ma	9/30/2008	W21 High	x	0	0.099	15.8	600
W-21-High	W-21-High	Mendall Ma	########	W21-HIGH	x	0	0.099	17.4	589
W-21-High	W-21-High	Mendall Ma	5/12/2009	W21-HIGH	x	0	0.099	8.48	908
W-21-High	W-21-High	Mendall Ma	6/3/2009	W21-HIGH	x	0	0.099	7.54	378
W-21-High	W-21-High	Mendall Ma	6/25/2009	W21-High	x	0	0.099	11	413
W-21-High	W-21-High	Mendall Ma	7/15/2009	W21-High	x	0	0.099	9.57	706
W-21-High	W-21-High	Mendall Ma	8/4/2009	W21-High-	x	0	0.099	8.68	341
W-21-High	W-21-High	Mendall Ma	8/26/2009	PB09-6120-0-3		0	0.099		923
W-21-High	W-21-High	Mendall Ma	8/26/2009	PB09-6121-3-6		0.099	0.198		820
W-21-High	W-21-High	Mendall Ma	8/26/2009	PB09-6122-6-9		0.198	0.297		1221
W-21-High	W-21-High	Mendall Ma	8/26/2009	PB09-6123-9-12		0.297	0.396		1321
W-21-High	W-21-High	Mendall Ma	8/26/2009	PB09-0-12_	x				1071.25
W-21-High	W-21-High	Mendall Ma	9/2/2009	W21-High-	x	0	0.099	7.21	441
W-21-High	W-21-High	Mendall Ma	6/1/2010	PB10-8268-0-3		0	0.099		762
W-21-High	W-21-High	Mendall Ma	6/1/2010	PB10-8269-3-6		0.099	0.198		1259
W-21-High	W-21-High	Mendall Ma	6/1/2010	PB10-8270-6-9		0.198	0.297		931
W-21-High	W-21-High	Mendall Ma	6/1/2010	PB10-0-9_	x				984
W-21-High	W-21-High	Mendall Ma	8/26/2010	W-21-High	x	0	0.099	8.315	588

W-21-High	W-21-High	Mendall Ma	4/12/2011	PB11-5000	x	0	0.099		536
W-21-High	W-21-High	Mendall Ma	8/22/2012	W21-High-.	x			16	429
W-21-High	W-21-High	Mendall Ma	8/22/2012	W21-High-	x			16.7	684
W-21-High	W-21-High	Mendall Ma	8/22/2012	W21-High-	x			13.2	821
W-21-High	W-21-High	Mendall Ma	8/22/2012	W21-High-	x			15.5	488
W-21-High	W-21-High	Mendall Ma	7/25/2016	W-21-HIGH	x	0	0	7.86	871
W-21-Interi	W-21-Interi	Mendall Ma	8/22/2007	W21-Interti	x	0	0.099	3.2	1400
W-21-Interi	W-21-Interi	Mendall Ma	7/23/2008	W21-Interti	x	0	0.099	6.9	959
W-21-Interi	W-21-Interi	Mendall Ma	8/5/2008	W21-INTEI	x	0	0.099	6.88	962
W-21-Interi	W-21-Interi	Mendall Ma	8/20/2008	W21-Interti	x	0	0.099	8.8	1100
W-21-Interi	W-21-Interi	Mendall Ma	9/3/2008	W21-Interti	x	0	0.099	7.78	1340
W-21-Interi	W-21-Interi	Mendall Ma	9/18/2008	W21-Interti	x	0	0.099	7.28	890
W-21-Interi	W-21-Interi	Mendall Ma	9/30/2008	W21 Interti	x	0	0.099	9.14	1090
W-21-Interi	W-21-Interi	Mendall Ma	########	W21-INTEI	x	0	0.099	5.75	789
W-21-Interi	W-21-Interi	Mendall Ma	5/12/2009	W21-INTEI	x	0	0.099	4.98	1120
W-21-Interi	W-21-Interi	Mendall Ma	6/3/2009	W21-INTEI	x	0	0.099	5.76	866
W-21-Interi	W-21-Interi	Mendall Ma	6/25/2009	W21-Interti	x	0	0.099	4.72	1220
W-21-Interi	W-21-Interi	Mendall Ma	7/15/2009	W21-Interti	x	0	0.099	5.85	1450
W-21-Interi	W-21-Interi	Mendall Ma	8/4/2009	W21-Interti	x	0	0.099	6.5	863
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5820-0-3		0	0.099		1154
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5821-3-6		0.099	0.198		1192
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5822-6-9		0.198	0.297		1126
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5823-9-12		0.297	0.396		1129
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-0-12					1150.25
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5824-0-3		0	0.099		1004
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5825-3-6		0.099	0.198		1130
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5826-6-9		0.198	0.297		1197
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5827-9-12		0.297	0.396		1228
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-0-12					1139.75
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5828-0-3		0	0.099		1314
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5829-3-6		0.099	0.198		1221
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5830-6-9		0.198	0.297		1036
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-5831-9-12		0.297	0.396		1130
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-0-12					1175.25
W-21-Interi	W-21-Interi	Mendall Ma	8/10/2009	PB09-all-0-	x				1155.083
W-21-Interi	W-21-Interi	Mendall Ma	9/2/2009	W21-Interti	x	0	0.099	5.71	1140
W-21-Interi	W-21-Interi	Mendall Ma	8/26/2010	W-21-Interi	x	0	0.099	3.575	657.75
W-21-Interi	W-21-Interi	Mendall Ma	8/22/2012	W21-Interti	x			5.37	591
W-21-Interi	W-21-Interi	Mendall Ma	8/22/2012	W21-Interti	x			6.5	723
W-21-Interi	W-21-Interi	Mendall Ma	8/22/2012	W21-Interti	x			6.47	738
W-21-Interi	W-21-Interi	Mendall Ma	8/22/2012	W21-Interti	x			6.85	759
W-21-Interi	W-21-Interi	Mendall Ma	7/25/2016	W-21-INTE	x	0	0	5.125	467
W-21-Low	W-21-Low	Mendall Ma	8/22/2007	W21-Low-(	x	0	0.099	2.7	1030
W-21-Low	W-21-Low	Mendall Ma	7/23/2008	W21-Low-(	x	0	0.099	7.39	1040
W-21-Low	W-21-Low	Mendall Ma	8/5/2008	W21-LOW-	x	0	0.099	8.03	944
W-21-Low	W-21-Low	Mendall Ma	8/20/2008	W21-Low-(	x	0	0.099	7.16	1040
W-21-Low	W-21-Low	Mendall Ma	9/3/2008	W21-Low-(	x	0	0.099	5.38	1240
W-21-Low	W-21-Low	Mendall Ma	9/18/2008	W21-Low-(	x	0	0.099	11.2	903
W-21-Low	W-21-Low	Mendall Ma	9/30/2008	W21 Low	x	0	0.099	8.48	1100
W-21-Low	W-21-Low	Mendall Ma	########	W21-LOW-	x	0	0.099	8.53	1030
W-21-Low	W-21-Low	Mendall Ma	5/12/2009	W21-LOW-	x	0	0.099	4.76	892
W-21-Low	W-21-Low	Mendall Ma	6/3/2009	W21-LOW-	x	0	0.099	4.49	848
W-21-Low	W-21-Low	Mendall Ma	6/25/2009	W21-Low	x	0	0.099	4.83	893
W-21-Low	W-21-Low	Mendall Ma	7/15/2009	W21-Low	x	0	0.099	4.76	1050
W-21-Low	W-21-Low	Mendall Ma	8/4/2009	W21-Low-(	x	0	0.099	5.19	872

W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5920-0-3		0	0.099		911
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5921-3-6		0.099	0.198		1156
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5922-6-9		0.198	0.297		1177
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5923-9-12		0.297	0.396		1279
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-0-12					1130.75
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5924-0-3		0	0.099		1066
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5925-3-6		0.099	0.198		1063
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5926-6-9		0.198	0.297		1192
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5927-9-12		0.297	0.396		1292
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-0-12					1153.25
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5928-0-3		0	0.099		1076
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5929-3-6		0.099	0.198		1075
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5930-6-9		0.198	0.297		1201
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-5931-9-12		0.297	0.396		1306
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-0-12					1164.5
W-21-Low	W-21-Low	Mendall Ma	8/13/2009	PB09-all-0-	x				1149.5
W-21-Low	W-21-Low	Mendall Ma	9/2/2009	W21-Low-(	x	0	0.099	4.51	823
W-21-Low	W-21-Low	Mendall Ma	6/2/2010	PB10-8227-0-3		0	0.099		1212
W-21-Low	W-21-Low	Mendall Ma	6/2/2010	PB10-8228-3-6		0.099	0.198		1237
W-21-Low	W-21-Low	Mendall Ma	6/2/2010	PB10-8229-6-9		0.198	0.297		1147
W-21-Low	W-21-Low	Mendall Ma	6/2/2010	PB10-0-9_	x				1198.667
W-21-Low	W-21-Low	Mendall Ma	8/26/2010	W-21-Low	x	0	0.099	5.1775	1029.25
W-21-Low	W-21-Low	Mendall Ma	4/12/2011	PB11-5003	x	0	0.099		584
W-21-Low	W-21-Low	Mendall Ma	8/22/2012	W21-Low-/	x			7.88	770
W-21-Low	W-21-Low	Mendall Ma	8/22/2012	W21-Low-E	x			8.19	919
W-21-Low	W-21-Low	Mendall Ma	8/22/2012	W21-Low-(	x			8.44	890
W-21-Low	W-21-Low	Mendall Ma	8/22/2012	W21-Low-[	x			8.27	816
W-21-Low	W-21-Low	Mendall Ma	7/25/2016	W-21-LOW	x	0	0	7.1	729
W-21-Mid	W-21-Mid	Mendall Ma	8/19/2007	W31-Mediu	x	0	0.099	0.92	17.6
W-21-Mid	W-21-Mid	Mendall Ma	8/22/2007	W21-Mediu	x	0	0.099	3	948
W-21-Mid	W-21-Mid	Mendall Ma	7/23/2008	W21-Mediu	x	0	0.099	6.53	1110
W-21-Mid	W-21-Mid	Mendall Ma	8/5/2008	W21-MEDI	x	0	0.099	10.3	666
W-21-Mid	W-21-Mid	Mendall Ma	8/20/2008	W21-Mediu	x	0	0.099	9.1	1000
W-21-Mid	W-21-Mid	Mendall Ma	9/3/2008	W21-Mediu	x	0	0.099	11.5	885
W-21-Mid	W-21-Mid	Mendall Ma	9/18/2008	W21-Mediu	x	0	0.099	18.9	786
W-21-Mid	W-21-Mid	Mendall Ma	9/30/2008	W21 Mid	x	0	0.099	12.5	785
W-21-Mid	W-21-Mid	Mendall Ma	########	W21-MEDI	x	0	0.099	12.4	1020
W-21-Mid	W-21-Mid	Mendall Ma	5/12/2009	W21-MID-(	x	0	0.099	6.78	775
W-21-Mid	W-21-Mid	Mendall Ma	6/3/2009	W21-MID-(	x	0	0.099	7.16	859
W-21-Mid	W-21-Mid	Mendall Ma	6/25/2009	W21-Mid	x	0	0.099	7.52	839
W-21-Mid	W-21-Mid	Mendall Ma	7/15/2009	W21-Mid	x	0	0.099	7.21	796
W-21-Mid	W-21-Mid	Mendall Ma	8/4/2009	W21-Mid-0	x	0	0.099	7.56	752
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6020-0-3		0	0.099		968
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6021-3-6		0.099	0.198		1086
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6022-6-9		0.198	0.297		995
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6023-9-12		0.297	0.396		1222
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-0-12					1067.75
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6024-0-3		0	0.099		1068
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6025-3-6		0.099	0.198		1061
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6026-6-9		0.198	0.297		1032
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6027-9-12		0.297	0.396		1064
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-0-12					1056.25
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6028-0-3		0	0.099		1082
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6029-3-6		0.099	0.198		1081
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6030-6-9		0.198	0.297		931

W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-6031-9-12		0.297	0.396		1252
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-0-12					1086.5
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2009	PB09-all-0-	x				1070.167
W-21-Mid	W-21-Mid	Mendall Ma	9/2/2009	W21-Mid-0	x	0	0.099	4.92	702
W-21-Mid	W-21-Mid	Mendall Ma	8/26/2010	W-21-Mid (	x	0	0.099	6.2475	834
W-21-Mid	W-21-Mid	Mendall Ma	8/22/2012	W21-Mid-A	x			11.9	626
W-21-Mid	W-21-Mid	Mendall Ma	8/22/2012	W21-Mid-B	x			11.8	796
W-21-Mid	W-21-Mid	Mendall Ma	8/22/2012	W21-Mid-C	x			12.3	622
W-21-Mid	W-21-Mid	Mendall Ma	8/22/2012	W21-Mid-D	x			11.4	714
W-21-Mid	W-21-Mid	Mendall Ma	7/25/2016	W-21-MID_	x	0	0	5.775	813
W-21-UM-(	W-21-UM-(	Mendall Ma	5/29/2010	PB10-8555-0-3		0	0.099		641
W-21-UM-(	W-21-UM-(	Mendall Ma	5/29/2010	PB10-8556-3-6		0.099	0.198		826
W-21-UM-(	W-21-UM-(	Mendall Ma	5/29/2010	PB10-8557-6-9		0.198	0.297		1121
W-21-UM-(	W-21-UM-(	Mendall Ma	5/29/2010	PB10-0-9_	x				862.6667
W-21-UM-(	W-21-UM-(	Mendall Ma	5/31/2010	PB10-8838	x	0	0.099		535
W-21-UM-(	W-21-UM-(	Mendall Ma	6/2/2010	PB10-8876	x	0	0.099		676
W-21-UM-(	W-21-UM-(	Mendall Ma	6/5/2010	PB10-8850	x	0	0.099		640
W-21-UM-(	W-21-UM-(	Mendall Ma	8/25/2010	W21-UM-C	x	0	0.099	8.96	569
W-21-UM-(	W-21-UM-(	Mendall Ma	8/25/2010	W21-UM-C	x	0	0.099	10.8	496
W-21-UM-(	W-21-UM-(	Mendall Ma	8/25/2010	W21-UM-C	x	0	0.099	10.8	546
W-21-UM-(	W-21-UM-(	Mendall Ma	8/25/2010	W21-UM-C	x	0	0.099	13	472
W-21-UM-(	W-21-UM-(	Mendall Ma	4/12/2011	PB11-5012	x	0	0.099		405
W-21-UM-(	W-21-UM-(	Mendall Ma	8/21/2012	W21-UM-C	x	0	0.099	26.2	189
W-21-UM-(	W-21-UM-(	Mendall Ma	8/21/2012	W21-UM-C	x	0	0.099	28.3	218
W-21-UM-(	W-21-UM-(	Mendall Ma	8/21/2012	W21-UM-C	x	0	0.099	29.7	197
W-21-UM-(	W-21-UM-(	Mendall Ma	8/21/2012	W21-UM-C	x	0	0.099	23.8	200
W-21-UM-(	W-21-UM-(	Mendall Ma	7/27/2016	W-21UM-C	x	0	0	13.45	552
W-21-UM-E	W-21-UM-E	Mendall Ma	5/28/2010	PB10-8514-0-3		0	0.099		673
W-21-UM-E	W-21-UM-E	Mendall Ma	5/28/2010	PB10-8515-3-6		0.099	0.198		719
W-21-UM-E	W-21-UM-E	Mendall Ma	5/28/2010	PB10-8516-6-9		0.198	0.297		900
W-21-UM-E	W-21-UM-E	Mendall Ma	5/28/2010	PB10-0-9_	x				764
W-21-UM-E	W-21-UM-E	Mendall Ma	5/31/2010	PB10-8762	x	0	0.099		575
W-21-UM-E	W-21-UM-E	Mendall Ma	6/2/2010	PB10-8864	x	0	0.099		652
W-21-UM-E	W-21-UM-E	Mendall Ma	6/5/2010	PB10-8774	x	0	0.099		598
W-21-UM-E	W-21-UM-E	Mendall Ma	8/25/2010	W21-UM-E	x	0	0.099	8.6	682
W-21-UM-E	W-21-UM-E	Mendall Ma	8/25/2010	W21-UM-E	x	0	0.099	8.44	563
W-21-UM-E	W-21-UM-E	Mendall Ma	8/25/2010	W21-UM-E	x	0	0.099	9.25	444
W-21-UM-E	W-21-UM-E	Mendall Ma	8/25/2010	W21-UM-E	x	0	0.099	10	705
W-21-UM-E	W-21-UM-E	Mendall Ma	4/12/2011	PB11-5015	x	0	0.099		518
W-21-UM-E	W-21-UM-E	Mendall Ma	8/22/2012	W21-UM-E	x	0	0.099	14.1	593
W-21-UM-E	W-21-UM-E	Mendall Ma	8/22/2012	W21-UM-E	x	0	0.099	14.9	494
W-21-UM-E	W-21-UM-E	Mendall Ma	8/22/2012	W21-UM-E	x	0	0.099	12.7	632
W-21-UM-E	W-21-UM-E	Mendall Ma	8/22/2012	W21-UM-E	x	0	0.099	14.3	559
W-21-UM-E	W-21-UM-E	Mendall Ma	7/25/2016	W-21UM-E	x	0	0	5.775	685
W-21-UM-S	W-21-UM-S	Mendall Ma	6/1/2010	PB10-8596-0-3		0	0.099		484
W-21-UM-S	W-21-UM-S	Mendall Ma	6/1/2010	PB10-8597-3-6		0.099	0.198		514
W-21-UM-S	W-21-UM-S	Mendall Ma	6/1/2010	PB10-8598-6-9		0.198	0.297		1160
W-21-UM-S	W-21-UM-S	Mendall Ma	6/1/2010	PB10-0-9_	x				719.3333
W-21-UM-S	W-21-UM-S	Mendall Ma	8/24/2010	W21-South	x	0	0.099	4.72	952
W-21-UM-S	W-21-UM-S	Mendall Ma	8/24/2010	W21-South	x	0	0.099	5.12	938
W-21-UM-S	W-21-UM-S	Mendall Ma	8/24/2010	W21-South	x	0	0.099	5.69	882
W-21-UM-S	W-21-UM-S	Mendall Ma	8/24/2010	W21-South	x	0	0.099	5.29	1230
W-21-UM-S	W-21-UM-S	Mendall Ma	4/12/2011	PB11-5006	x	0	0.099		284
W-21-UM-S	W-21-UM-S	Mendall Ma	8/21/2012	W21-UM-S	x	0	0.099	20.7	266
W-21-UM-S	W-21-UM-S	Mendall Ma	8/21/2012	W21-UM-S	x	0	0.099	23.7	216

W-21-UM-S	W-21-UM-S	Mendall Ma	8/21/2012	W21-UM-S	x	0	0.099	18.3	365
W-21-UM-S	W-21-UM-S	Mendall Ma	8/21/2012	W21-UM-S	x	0	0.099	18.5	348
W-21-UM-S	W-21-UM-S	Mendall Ma	7/27/2016	W-21UM-S	x	0	0	10.9	318
W-21-UM-\	W-21-UM-\	Mendall Ma	8/13/2009	W21-Uppe	x	0	0.099		304
W-21-UM-\	W-21-UM-\	Mendall Ma	8/21/2009	W21-Uppe	x	0	0.099		161
W-21-UM-\	W-21-UM-\	Mendall Ma	8/24/2009	W21-Uppe	x	0	0.099		198
W-21-UM-\	W-21-UM-\	Mendall Ma	8/28/2009	PB09-6779-0-3		0	0.099		180
W-21-UM-\	W-21-UM-\	Mendall Ma	8/28/2009	PB09-6780-3-6		0.099	0.198		258
W-21-UM-\	W-21-UM-\	Mendall Ma	8/28/2009	PB09-6781-6-9		0.198	0.297		761
W-21-UM-\	W-21-UM-\	Mendall Ma	8/28/2009	PB09-6782-9-12		0.297	0.396		588
W-21-UM-\	W-21-UM-\	Mendall Ma	8/28/2009	PB09-0-12	x				446.75
W-21-UM-\	W-21-UM-\	Mendall Ma	5/27/2010	PB10-8634	x	0	0.099		241
W-21-UM-\	W-21-UM-\	Mendall Ma	5/30/2010	PB10-8473-0-3		0	0.099		245
W-21-UM-\	W-21-UM-\	Mendall Ma	5/30/2010	PB10-8474-3-6		0.099	0.198		470
W-21-UM-\	W-21-UM-\	Mendall Ma	5/30/2010	PB10-8475-6-9		0.198	0.297		664
W-21-UM-\	W-21-UM-\	Mendall Ma	5/30/2010	PB10-0-9_	x				459.6667
W-21-UM-\	W-21-UM-\	Mendall Ma	6/2/2010	PB10-8686	x	0	0.099		185
W-21-UM-\	W-21-UM-\	Mendall Ma	6/5/2010	PB10-8698	x	0	0.099		187
W-21-UM-\	W-21-UM-\	Mendall Ma	8/25/2010	W21-UM-V	x	0	0.099	14.3	237
W-21-UM-\	W-21-UM-\	Mendall Ma	8/25/2010	W21-UM-V	x	0	0.099	15.7	179
W-21-UM-\	W-21-UM-\	Mendall Ma	8/25/2010	W21-UM-V	x	0	0.099	13.7	377
W-21-UM-\	W-21-UM-\	Mendall Ma	8/25/2010	W21-UM-V	x	0	0.099	14.8	348
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-9008-0-3		0	0.099		235
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-9020-0-3		0	0.099		202
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-9032-0-3		0	0.099		302
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-9044-0-3		0	0.099		277
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-9056-0-3		0	0.099		282
W-21-UM-\	W-21-UM-\	Mendall Ma	9/21/2010	PB10-0-3_	x				259.6
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9089-0-3		0	0.099		212
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9102-0-3		0	0.099		142
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9115-0-3		0	0.099		188
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9129-0-3		0	0.099		258
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9142-0-3		0	0.099		171
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9155-0-3		0	0.099		144
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9169-0-3		0	0.099		164
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9182-0-3		0	0.099		192
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9195-0-3		0	0.099		208
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9209-0-3		0	0.099		248
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9222-0-3		0	0.099		301
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9235-0-3		0	0.099		260
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9249-0-3		0	0.099		172
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9262-0-3		0	0.099		185
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9275-0-3		0	0.099		210
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-0-3_	x				203.6667
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9489-0-3		0	0.099		29
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9502-0-3		0	0.099		10
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-9515-0-3		0	0.099		203
W-21-UM-\	W-21-UM-\	Mendall Ma	########	PB10-0-3_	x				80.66667
W-21-UM-\	W-21-UM-\	Mendall Ma	4/12/2011	PB11-5018	x	0	0.099		193
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5029-0-3		0	0.099		233
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5041-0-3		0	0.099		309
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5053-0-3		0	0.099		237
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5065-0-3		0	0.099		295
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5077-0-3		0	0.099		166
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5089-0-3		0	0.099		226

W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5101-0-3		0	0.099		302
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5113-0-3		0	0.099		208
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5125-0-3		0	0.099		298
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5137-0-3		0	0.099		202
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5149-0-3		0	0.099		337
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5161-0-3		0	0.099		306
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5173-0-3		0	0.099		268
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5185-0-3		0	0.099		282
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-5197-0-3		0	0.099		280
W-21-UM-\	W-21-UM-\	Mendall Ma	6/7/2011	PB11-0-3_	x				263.2667
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5868-0-3		0	0.099		189
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5879-0-3		0	0.099		183
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5890-0-3		0	0.099		140
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5901-0-3		0	0.099		222
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5912-0-3		0	0.099		194
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5923-0-3		0	0.099		182
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5934-0-3		0	0.099		188
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5945-0-3		0	0.099		184
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5956-0-3		0	0.099		206
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5967-0-3		0	0.099		247
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5978-0-3		0	0.099		243
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-5989-0-3		0	0.099		260
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-6000-0-3		0	0.099		218
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-6011-0-3		0	0.099		196
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-6022-0-3		0	0.099		238
W-21-UM-\	W-21-UM-\	Mendall Ma	9/29/2011	PB11-0-3_	x				206
W-21-UM-\	W-21-UM-\	Mendall Ma	8/21/2012	W21-UM-V	x	0	0.099	31	134
W-21-UM-\	W-21-UM-\	Mendall Ma	8/21/2012	W21-UM-V	x	0	0.099	32	131
W-21-UM-\	W-21-UM-\	Mendall Ma	8/21/2012	W21-UM-V	x	0	0.099	28.9	214
W-21-UM-\	W-21-UM-\	Mendall Ma	8/21/2012	W21-UM-V	x	0	0.099	29.8	142
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6229-0-3		0	0.099		179
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6241-0-3		0	0.099		150
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6253-0-3		0	0.099		128
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6265-0-3		0	0.099		136
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6277-0-3		0	0.099		176
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6289-0-3		0	0.099		161
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6301-0-3		0	0.099		246
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6313-0-3		0	0.099		201
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-6325-0-3		0	0.099		175
W-21-UM-\	W-21-UM-\	Mendall Ma	9/25/2012	PB12-0-3_	x				172.4444
W-21-UM-\	W-21-UM-\	Mendall Ma	7/27/2016	W-21UM-V	x	0	0	11.35	437
W-61-High	W-61-High	Verona Eas	8/19/2007	W61-High-	x	0	0.099	6.2	259
W-61-High	W-61-High	Verona Eas	8/23/2012	W61-High-	x	0	0.099	11.4	147
W-61-High	W-61-High	Verona Eas	8/23/2012	W61-High-	x	0	0.099	29.1	640
W-61-High	W-61-High	Verona Eas	8/23/2012	W61-High-	x	0	0.099	26.4	529
W-61-High	W-61-High	Verona Eas	8/23/2012	W61-High-	x	0	0.099	7.16	76.2
W-61-High	W-61-High	Verona Eas	11/8/2016	W-61-HIGH	x	0	0	15.8	318
W-61-Interl	W-61-Interl	Verona Eas	8/19/2007	W61-Interti	x	0	0.099	2.9	651
W-61-Interl	W-61-Interl	Verona Eas	8/23/2012	W61-Interti	x	0	0.099	2.5	362
W-61-Interl	W-61-Interl	Verona Eas	8/23/2012	W61-Interti	x	0	0.099	2.12	276
W-61-Interl	W-61-Interl	Verona Eas	8/23/2012	W61-Interti	x	0	0.099	2.16	309
W-61-Interl	W-61-Interl	Verona Eas	8/23/2012	W61-Interti	x	0	0.099		467
W-61-Interl	W-61-Interl	Verona Eas	7/27/2016	W-61-HIGH	x	0	0	2.34	
W-61-Interl	W-61-Interl	Verona Eas	11/8/2016	W-61-INT_	x	0	0	10.9	980
W-61-Low	W-61-Low	Verona Eas	8/19/2007	W61-Low-(	x	0	0.099	4.5	880

W-61-Low	W-61-Low	Verona Ea:	8/23/2012	W61-Low-/	x	0	0.099	10.4	502
W-61-Low	W-61-Low	Verona Ea:	8/23/2012	W61-Low-E	x	0	0.099	11.3	483
W-61-Low	W-61-Low	Verona Ea:	8/23/2012	W61-Low-(	x	0	0.099	10.5	498
W-61-Low	W-61-Low	Verona Ea:	8/23/2012	W61-Low-[	x	0	0.099	10.1	576
W-61-Low	W-61-Low	Verona Ea:	11/8/2016	W-61-LOW	x	0	0	8.51	773
W-61-Mid	W-61-Mid	Verona Ea:	8/19/2007	W61-Mediu	x	0	0.099	4.5	742
W-61-Mid	W-61-Mid	Verona Ea:	8/23/2012	W61-Mid-A	x	0	0.099	9.27	274
W-61-Mid	W-61-Mid	Verona Ea:	8/23/2012	W61-Mid-E	x	0	0.099	15.5	382
W-61-Mid	W-61-Mid	Verona Ea:	8/23/2012	W61-Mid-C	x	0	0.099	10.2	236
W-61-Mid	W-61-Mid	Verona Ea:	8/23/2012	W61-Mid-D	x	0	0.099	12.8	530
W-61-Mid	W-61-Mid	Verona Ea:	11/8/2016	W-61-MID_	x	0	0	12.05	682
W-63-Low	W-63-Low	Orrington	11/8/2016	W-63-LOW	x	0	0	2.5	217
W-63-High	W-63-High	Orrington	7/22/2008	W63-High-	x	0	0.099	4.87	727
W-63-High	W-63-High	Orrington	8/4/2008	W63-HIGH	x	0	0.099	6.94	1030
W-63-High	W-63-High	Orrington	8/20/2008	W63-High-	x	0	0.099	5.64	371
W-63-High	W-63-High	Orrington	9/3/2008	W63-High-	x	0	0.099	5.92	603
W-63-High	W-63-High	Orrington	9/16/2008	W63-High-	x	0	0.099	5.81	420
W-63-High	W-63-High	Orrington	9/30/2008	W63-High-	x	0	0.099	5.53	752
W-63-High	W-63-High	Orrington	########	W63-HIGH	x	0	0.099	8.89	242
W-63-High	W-63-High	Orrington	5/12/2009	W63-HIGH	x	0	0.099	2.39	320
W-63-High	W-63-High	Orrington	6/2/2009	W63-HIGH	x	0	0.099	2.95	319
W-63-High	W-63-High	Orrington	6/24/2009	W63-High	x	0	0.099	2.02	214
W-63-High	W-63-High	Orrington	7/16/2009	W63-High	x	0	0.099	2.44	299
W-63-High	W-63-High	Orrington	8/4/2009	W63-High-	x	0	0.099	2.41	221
W-63-High	W-63-High	Orrington	9/1/2009	W63-High-	x	0	0.099	2.63	405
W-63-High	W-63-High	Orrington	8/25/2010	W-63-High	x	0	0.099	2.4525	300.25
W-63-High	W-63-High	Orrington	7/21/2016	W-63-HIGH	x	0	0	2.065	
W-63-High	W-63-High	Orrington	11/8/2016	W-63-HIGH	x	0	0	0.4075	37.9
W-63-Interi	W-63-Interi	Orrington	11/8/2016	W-63-INT_	x	0	0	9.8	1050
W-65-High	W-65-High	Mendall Ma	8/25/2010	W-65-High	x	0	0.099	11.7225	186.5
W-65-High	W-65-High	Mendall Ma	8/22/2012	W65-High-.	x			30.4	279
W-65-High	W-65-High	Mendall Ma	8/22/2012	W65-High-	x			32.2	239
W-65-High	W-65-High	Mendall Ma	8/22/2012	W65-High-	x			32.9	126
W-65-High	W-65-High	Mendall Ma	8/22/2012	W65-High-	x			30.2	125
W-65-High	W-65-High	Mendall Ma	7/25/2016	W-65-HIGH	x	0	0	15.3	91.5
W-65-Interi	W-65-Interi	Mendall Ma	8/26/2010	W-65-Interi	x	0	0.099	3.84	655.25
W-65-Interi	W-65-Interi	Mendall Ma	8/22/2012	W65-Interti	x			4.01	308
W-65-Interi	W-65-Interi	Mendall Ma	8/22/2012	W65-Interti	x			3.44	320
W-65-Interi	W-65-Interi	Mendall Ma	8/22/2012	W65-Interti	x			5.93	552
W-65-Interi	W-65-Interi	Mendall Ma	8/22/2012	W65-Interti	x			6.28	635
W-65-Interi	W-65-Interi	Mendall Ma	7/25/2016	W-65-INTE	x	0	0	0.458	42.2
W-65-Mid	W-65-Mid	Mendall Ma	8/26/2010	W-65-Mid (	x	0	0.099	10.025	238.5
W-65-Mid	W-65-Mid	Mendall Ma	8/22/2012	W65-Mid-A	x			28.4	385
W-65-Mid	W-65-Mid	Mendall Ma	8/22/2012	W65-Mid-E	x			28.1	233
W-65-Mid	W-65-Mid	Mendall Ma	8/22/2012	W65-Mid-C	x			29.6	295
W-65-Mid	W-65-Mid	Mendall Ma	8/22/2012	W65-Mid-D	x			26.2	427
W-65-Mid	W-65-Mid	Mendall Ma	7/25/2016	W-65-MID_	x	0	0	26	267
W-65-UM-I	W-65-High	Mendall Ma	8/26/2010	W-65-UM-I	x	0	0.099	11.395	395.75
OB-05	OB-05	Orrington	8/8/2006	OB-5 0-1 cm		0	0.033	7.192	792.3
OB-05	OB-05	Orrington	8/8/2006	OB-5 1-2 cm		0.033	0.066	6.851	1180
OB-05	OB-05	Orrington	8/8/2006	OB-5 2-3 cm		0.066	0.099	7.986	1303
OB-05	OB-05	Orrington	8/8/2006	OB-5 3-4 cm		0.099	0.132	8.888	1332
OB-05	OB-05	Orrington	8/8/2006	OB-5 4-5 cm		0.132	0.165	9.367	
OB-05	OB-05	Orrington	8/8/2006	OB-5 4-5 cm		0.132	0.165		1456
OB-05	OB-05	Orrington	8/8/2006	OB-5 5-6 cm		0.165	0.198	9.34	1420

OB-05	OB-05	Orrington	8/8/2006	OB-5 6-7 cm	0.198	0.231	7.8987	1412
OB-05	OB-05	Orrington	8/8/2006	OB-5 7-8 cm	0.231	0.264	7.8672	1406
OB-05	OB-05	Orrington	8/8/2006	OB-5 8-9 cm	0.264	0.297	8.6044	567.2
OB-05	OB-05	Orrington	8/8/2006	OB-5 9-10 cm	0.297	0.33	9.1547	1530
OB-05	OB-05	Orrington	8/8/2006	OB-5 0-10 x			8.3149	1239.85
OB-05	OB-05	Orrington	9/7/2006	OB-5 0-1 cm	0	0.033	7.5557	951.4
OB-05	OB-05	Orrington	9/7/2006	OB-5 1-2 cm	0.033	0.066	10.6036	1183
OB-05	OB-05	Orrington	9/7/2006	OB-5 8-9 cm	0.264	0.297	6.3881	
OB-05	OB-05	Orrington	9/7/2006	OB5 2-3 cm	0.066	0.099	9.332	1351
OB-05	OB-05	Orrington	9/7/2006	OB5 3-4 cm	0.099	0.132	8.9579	1334
OB-05	OB-05	Orrington	9/7/2006	OB5 4-5 cm	0.132	0.165	8.9659	1315
OB-05	OB-05	Orrington	9/7/2006	OB5 5-6 cm	0.165	0.198	8.936	1093
OB-05	OB-05	Orrington	9/7/2006	OB5 6-7 cm	0.198	0.231	8.8394	1311
OB-05	OB-05	Orrington	9/7/2006	OB5 7-8 cm	0.231	0.264	7.5277	1105
OB-05	OB-05	Orrington	9/7/2006	OB5 8-9 cm	0.264	0.297		457.1
OB-05	OB-05	Orrington	9/7/2006	OB5 9-10 cm	0.297	0.33	5.621	281.8
OB-05	OB-05	Orrington	9/7/2006	OB5 0-10 c x			8.27273	1038.23
OB-05	OB-05	Orrington	9/26/2006	OB 5-0-1	0	0.033	6.7703	958.729
OB-05	OB-05	Orrington	9/26/2006	OB 5-2-3	0.066	0.099	9.6	986.468
OB-05	OB-05	Orrington	9/26/2006	OB 5-3-4	0.099	0.132	8.0905	1161.74
OB-05	OB-05	Orrington	9/26/2006	OB 5-4-5	0.132	0.165		1153.2
OB-05	OB-05	Orrington	9/26/2006	OB 5-5-6	0.165	0.198	8.5723	1404.59
OB-05	OB-05	Orrington	9/26/2006	OB 5-6-7	0.198	0.231	9.2617	1140.6
OB-05	OB-05	Orrington	9/26/2006	OB 5-8-9	0.264	0.297		1662.13
OB-05	OB-05	Orrington	9/26/2006	OB-05-4-5	0.132	0.165	6.8295	
OB-05	OB-05	Orrington	9/26/2006	OB-05-8-9	0.264	0.297	7.9487	
OB-05	OB-05	Orrington	9/26/2006	OB5-1-2	0.033	0.066	7.8883	937.842
OB-05	OB-05	Orrington	9/26/2006	OB5-7-8	0.231	0.264	6.7674	1410.46
OB-05	OB-05	Orrington	9/26/2006	OB5-9-10	0.297	0.33	7.4363	1587.34
OB-05	OB-05	Orrington	9/26/2006	OB5-0-10_ x			7.9165	1240.31
OB-05	OB-05	Orrington	########	OB5-0-1	0	0.033	8.7085	1168.56
OB-05	OB-05	Orrington	########	OB5-1-2	0.033	0.066	8.7848	1120.98
OB-05	OB-05	Orrington	########	OB5-2-3	0.066	0.099	9.9746	1753.5
OB-05	OB-05	Orrington	########	OB5-3-4	0.099	0.132	9.6647	1439.85
OB-05	OB-05	Orrington	########	OB5-4-5	0.132	0.165	9.2839	1391.38
OB-05	OB-05	Orrington	########	OB5-5-6	0.165	0.198	9.3889	1610.03
OB-05	OB-05	Orrington	########	OB5-6-7	0.198	0.231	9.5508	1525.24
OB-05	OB-05	Orrington	########	OB5-7-8	0.231	0.264	10.5902	1805.51
OB-05	OB-05	Orrington	########	OB5-8-9	0.264	0.297	12.0968	2048.13
OB-05	OB-05	Orrington	########	OB5-9-10	0.297	0.33	10.2295	2071.58
OB-05	OB-05	Orrington	########	OB5-0-10_ x			9.82727	1593.476
OB-05	OB-05	Orrington	5/30/2007	OB5 -1-2 cm	0.033	0.066	8.42	1218.47
OB-05	OB-05	Orrington	5/30/2007	OB5 -5-6 cm	0.165	0.198	6.09	983.987
OB-05	OB-05	Orrington	5/30/2007	OB5 -7-8 cm	0.231	0.264	2.41	255.263
OB-05	OB-05	Orrington	5/30/2007	OB5 -9-10 cm	0.297	0.33	1.58	218.539
OB-05	OB-05	Orrington	5/30/2007	OB5-0-1	0	0.033	7.59	1107.81
OB-05	OB-05	Orrington	5/30/2007	OB5-2-3	0.066	0.099	8.57	1130.86
OB-05	OB-05	Orrington	5/30/2007	OB5-3-4	0.099	0.132	8.09	1113.28
OB-05	OB-05	Orrington	5/30/2007	OB5-4-5	0.132	0.165	7.07	1035.15
OB-05	OB-05	Orrington	5/30/2007	OB5-6-7	0.198	0.231	7.02	856.098
OB-05	OB-05	Orrington	5/30/2007	OB5-8-9	0.264	0.297	0.88	63.2895
OB-05	OB-05	Orrington	5/30/2007	OB5-0-10_ x			5.772	798.2747
OB-05	OB-05	Orrington	7/9/2007	OB5 -0-1 cm	0	0.033	6.17	1120
OB-05	OB-05	Orrington	7/9/2007	OB5 -1-2 cm	0.033	0.066	6.15	1190
OB-05	OB-05	Orrington	7/9/2007	OB5 -2-3 cm	0.066	0.099	6.49	1290

OB-05	OB-05	Orrington	7/9/2007	OB5 -3-4 cm		0.099	0.132	7.69	1570
OB-05	OB-05	Orrington	7/9/2007	OB5 -4-5 cm		0.132	0.165	7.86	1520
OB-05	OB-05	Orrington	7/9/2007	OB5 -5-6 cm		0.165	0.198	7.89	1660
OB-05	OB-05	Orrington	7/9/2007	OB5 -6-7 cm		0.198	0.231	7.96	1640
OB-05	OB-05	Orrington	7/9/2007	OB5 -7-8 cm		0.231	0.264	8.39	1630
OB-05	OB-05	Orrington	7/9/2007	OB5 -8-9 cm		0.264	0.297	8.22	1860
OB-05	OB-05	Orrington	7/9/2007	OB5 -9-10 cm		0.297	0.33	7.1	1510
OB-05	OB-05	Orrington	7/9/2007	OB5 -0-10	x			7.392	1499
OB-05-Inte	OB-05	Orrington	8/25/2010	OB-05-Inte	x	0	0.099	4.21	1004.8
OB-05	OB-05	Orrington	8/21/2012	OB5-Interti	x	0	0.099	6.97	948
OB-05	OB-05	Orrington	8/21/2012	OB5-Interti	x	0	0.099	6.63	1150
OB-05	OB-05	Orrington	8/21/2012	OB5-Interti	x	0	0.099	7.55	1550
OB-05	OB-05	Orrington	8/21/2012	OB5-Interti	x	0	0.099	5.72	1040
OB-05	OB-05	Orrington	8/21/2012	OB5-Interti	x	0	0.099	4.79	663
OB-05	OB-05	Orrington	7/26/2016	OB-05_072	x	0	0	5.745	550

Methyl.mer	Adj.Mercur	Adj.Methyl.mercury.NG.G.Result
25.6267	1590	25.6267
32.2866	1740	32.2866
33.3302	1840	33.3302
25.7097	1730	25.7097
23.6219	1450	23.6219
24.8836	1560	24.8836
29	606	29
30.5	864	30.5
26.9	810	26.9
29.2	760	29.2
19.5	830	19.5
27.4	788	27.4
27.1	760	27.1
16.4	777	16.4
9.52	672	9.52
8.74	931	8.74
17.7	654	17.7
10.7	458	10.7
20.4	671	20.4
15.5	627	15.5
23.1	788	23.1
15	778	15
17.86667	731	17.86667
16.1	699	16.1
12.1	733	12.1
18.7	790	18.7
14.9	813	14.9
15.23333	778.6667	15.23333
23.1	672	23.1
31.7	755	31.7
29	583	29
	702	
12.3	1207	24.6
6.69	447	6.69
5.79	369	5.79
33.2	651	33.2
8.61	530	8.61
7.07	564	7.07
8.52	696	8.52
5.88	456	5.88
5.92	462	5.92
5.59	433	5.59
4.78	482	4.78
5.25	500	5.25
3.77	360	3.77
6.49	493	6.49
7.12	1859	7.12
4.74	403	4.74
5.9	514	5.9
6.747	576.3333	6.747
11.3	459	11.3
10.9	432	10.9
	522	
6.72	567	13.44

3.14	278	3.14
2.66	268	2.66
3.8	369	3.8
3.81	253	3.81
3.66	324	3.66
2.9	334	2.9
3.83	271	3.83
2.17	244	2.17
2.43	225	2.43
2.3	425	2.3
2.64	286	2.64
3.05	252	3.05
2.32	231	2.32
2.31	289	2.31
2.627	293	2.627
6.84	163	6.84
5.19	240	5.19
	313	
9.38	569	18.76
5.26247	950.4	5.26247
4.7591	1009	4.7591
6.83845	837.9	6.83845
7.02028	998.4	7.02028
9.48134	843.5	9.48134
7.25009	1035	7.25009
8.23201	1016	8.23201
7.96469	994.1	7.96469
6.90187	1164	6.90187
6.34614	1098	6.34614
7.005644	994.63	7.005644
17.686	1209	17.686
20.1229	1201	20.1229
18.28	1309	18.28
13.4531	1012	13.4531
14.8016	1178	14.8016
14.4991	1005	14.4991
12.8397	1005	12.8397
11.2767	1169	11.2767
17.2785	906.9	17.2785
17.4836	1047	17.4836
15.77212	1104.19	15.77212
7.67629	553.366	7.67629
10.4534	638.469	10.4534
16.8223	890.553	16.8223
17.5305	846.138	17.5305
22.7667	895.791	22.7667
21.4991	1700.38	21.4991
19.0009	1491.08	19.0009
17.1491	1942.81	17.1491
13.1762	1745.42	13.1762
19.3891	1772.96	19.3891
16.54636	1247.697	16.54636
8.67654	1161.67	8.67654
8.21114	1508.82	8.21114
8.70832	1454.2	8.70832

7.96706	1312.83	7.96706
8.68717	1297.04	8.68717
12.1433	1378.52	12.1433
14.7418	1376.3	14.7418
21.1365	1366.95	21.1365
23.0163	1350.8	23.0163
17.8153	1353.37	17.8153
13.11034	1356.05	13.11034
23.5353	909.612	23.5353
21.7268	1021.04	21.7268
36.3221	1014.74	36.3221
29.8103	1098.73	29.8103
30.6193	1370.14	30.6193
50.9927	1167.86	50.9927
66.7195	1089.03	66.7195
46.049	1207.92	46.049
43.371	1234.7	43.371
36.742	1161.37	36.742
38.5888	1127.514	38.5888
18.5105	959.357	18.5105
28.7633	1107.15	28.7633
28.0042	1110.59	28.0042
31.7536	1341.22	31.7536
24.3	1527.2	24.3
42.2	1528	42.2
51.5	1667.3	51.5
26.3914	1908.66	26.3914
15.8544	1960.6	15.8544
27.3	2247.26	27.3
29.45774	1535.734	29.45774
27.7	823	27.7
26.4	1000	26.4
16.8	1080	16.8
	1020	
	986	
22.2	961	44.4
24.9		24.9
32.29		32.29
27.7	863	27.7
33.33		33.33
27.01		27.01
30.96		30.96
15.7	780.2	15.7
1.655	692.3	1.655
9.392	726.7	9.392
9.477	717.1	9.477
8.974	578.5	8.974
6.666	381.8	6.666
5.618	461.5	5.618
5.391	461.4	5.391
3.195	108.8	3.195
1.535	87.26	1.535
2.04	85.86	2.04
5.3943	430.122	5.3943
22.9817	1041	22.9817

30.4889	434.4	30.4889
32.1049	603.7	32.1049
26.1484	534.4	26.1484
10.8353	273.6	10.8353
7.19324	459.3	7.19324
12.7144	341.7	12.7144
8.25659	567.1	8.25659
7.2801	482.7	7.2801
4.71308	336.6	4.71308
16.27166	507.45	16.27166
9.63208	917.116	9.63208
9.38009	512.902	9.38009
8.86129	490.375	8.86129
6.88392	490.735	6.88392
6.90203	467.752	6.90203
5.34424	401.139	5.34424
3.8578	415.842	3.8578
4.41933	449.902	4.41933
4.424	398.671	4.424
5.83234	477.778	5.83234
6.553712	502.2212	6.553712
17.5326	984.024	17.5326
26.7805	1045.22	26.7805
27.1103	1234.53	27.1103
31.7135	1402.52	31.7135
28.654	1393.64	28.654
27.5056	1396.84	27.5056
23.0025	1325.89	23.0025
18.0802	1224.91	18.0802
19.7315	1295.28	19.7315
22.6515	1457.04	22.6515
24.27622	1275.989	24.27622
41.6777	1103.97	41.6777
41.4	1119.8	41.4
47.4624	785.54	47.4624
35.7335	501.982	35.7335
20.9841	608.516	20.9841
28.6665	538.905	28.6665
11.7407	511.286	11.7407
15.9159	344.167	15.9159
20.4323	552.057	20.4323
24.5378	597.052	24.5378
28.85509	666.3275	28.85509
29.771	1066.34	29.771
32.3117	1929.39	32.3117
25.9393	723.087	25.9393
25.2	366.516	25.2
20.098	395.346	20.098
23.6619	364.923	23.6619
11.537	303.496	11.537
23.2961	332.495	23.2961
15.3055	399.588	15.3055
12.771	373.937	12.771
21.98915	625.5118	21.98915
13.3	432	13.3

4.92	188	4.92
5.58	169	5.58
	238	
	190	
16.8	416	33.6
55.2	2310	55.2
46.6	1640	46.6
51.2	1550	51.2
73.1	1710	73.1
62.6	1550	62.6
0.252	11.49	0.252
1.14881	43.44	1.14881
0.3794	27.74815	0.3794
0.32276	23.95	0.32276
0.22649	17.9	0.22649
0.274625	20.925	0.274625
0.16182	19.61317	0.16182
0.44205	21.4	0.44205
0.62	20.3	0.62
0.7	19.1	0.7
0.64	17.8	0.64
	17.1	
	17.8	
0.02	27.7	0.04
0.098	21.844	0.098
0.328	34.57	0.328
0.92482	76.34	0.92482
0.54117	61.6718	0.54117
0.82401	88.4713	0.82401
1.07392	89.9169	1.07392
0.78666	83.2751	0.78666
1.1697	99.0765	1.1697
1.3228	135.015	1.3228
0.9139	140.383	0.9139
1.47745	196.223	1.47745
1.25854	150.294	1.25854
1.18551	113.213	1.18551
1.58589	168.811	1.58589
1.159838	126.4679	1.159838
1.10326	50.9251	1.10326
1.3431	86.5084	1.3431
1.89184	91.7971	1.89184
1.16787	62.2945	1.16787
0.87947	60.3834	0.87947
0.59188	61.1418	0.59188
0.44335	56.1176	0.44335
4.35532	186.03	4.35532
1.81644	107.189	1.81644
0.81317	65.3289	0.81317
1.44057	82.77158	1.44057
0.63691	44.5	0.63691
0.815	59.4	0.815
1.37009	72.9	1.37009
1.18734	75.3	1.18734
3.42073	76.1	3.42073

1.27493	84.2	1.27493
0.93041	102.2	0.93041
1.373	91.2	1.373
0.28996	67.3	0.28996
0.30875	37.4	0.30875
1.160712	71.05	1.160712
0.21	33.1	0.21
0.3	25.7	0.3
0.18	24.6	0.18
	28.3	
	28.2	
3.68	62.8	7.36
1.11	10.54	1.11
0.155	116.4	0.155
0.095	29.22	0.095
0.108	298.7	0.108
0.096	161.6	0.096
0.12	228.2	0.12
0.123	144.4	0.123
0.137	165	0.137
0.125	185.2	0.125
0.16	130.4	0.16
0.2229	146.966	0.2229
6.42627	128.142	6.42627
3.019	196.366	3.019
3.23908	176.268	3.23908
2.95145	191.078	2.95145
3.18098	200.122	3.18098
2.58626	136.874	2.58626
2.87392	189.398	2.87392
1.68877	186.966	1.68877
2.03097	134.953	2.03097
1.90073	137.419	1.90073
2.989743	167.7586	2.989743
4.50503	258.093	4.50503
2.45552	259.547	2.45552
1.90679	410.431	1.90679
1.38563	469.524	1.38563
1.11367	501.69	1.11367
1.32479	481.861	1.32479
1.3999	450.667	1.3999
1.0719	879.87	1.0719
1.36399	514.653	1.36399
1.23128	703.002	1.23128
1.77585	492.9338	1.77585
1.05541	237.466	1.05541
0.57567	180.752	0.57567
0.5736	321.247	0.5736
0.47095	281.734	0.47095
0.40669	177.262	0.40669
0.41518	255.042	0.41518
0.35194	205.16	0.35194
0.36585	228.68	0.36585
0.25859	250.615	0.25859
0.38252	240.699	0.38252

0.48564	237.8657	0.48564
4.1328	283.24	4.1328
2.88254	352.09	2.88254
2.36957	283.291	2.36957
2.33616	260.51	2.33616
1.98616	246.039	1.98616
2.4494	300.804	2.4494
1.63459	264.914	1.63459
1.33807	301.945	1.33807
1.98332	267.822	1.98332
1.57552	263.122	1.57552
2.268813	282.3777	2.268813
9.01282	347	9.01282
2.39641	324	2.39641
1.59653	286	1.59653
1.4083	280	1.4083
1.55	346	1.55
0.876	346	0.876
0.80763	277	0.80763
0.98392	330	0.98392
0.78357	244	0.78357
0.64353	274	0.64353
2.005871	305.4	2.005871
3.9	161	3.9
4.49	120	4.49
2.77	113	2.77
	126	
	102	
0.009	22.3	0.018
3.504	146.6	3.504
22.2	1267	44.4
38.5	1400	38.5
10.8	507	10.8
17.9	872	17.9
20.4	906	20.4
18.8	932	18.8
18.2	790	18.2
16	628	16
13.2	882	13.2
17	658	17
27.4	708	27.4
9.44	1290	9.44
13.9	752	13.9
28.8	1440	28.8
18.4	566	18.4
16.9	805	16.9
31.4	877	31.4
25.7	859	25.7
23.1	776.75	23.1
42.1	2670	42.1
16.7	774.25	16.7
2.2	518	4.4
15.4	664	15.4
15.5	524	15.5
	567	

	609	
67.9	1230	67.9
6.81	413	6.81
16.8	1540	16.8
48.3	996	48.3
69.9	908	69.9
29.1	1220	29.1
26.5	1050	26.5
20.4	1060	20.4
12.9	305	12.9
12.4	785	12.4
40.7	1410	40.7
17.6	565	17.6
11.6	566	11.6
29	689	29
10.8	436	10.8
5.68	466	5.68
3.83	377	3.83
12.3275	492	12.3275
75.2	2510	75.2
17.6	849	17.6
3.18	324	3.18
0.38	213	0.38
7.053333	462	7.053333
26.15	1405.25	26.15
2.85	471	5.7
61.5	866	61.5
58.6	933	58.6
	915	
	1000	
3.01	1179	6.02
49.3	779	49.3
28.6	873	28.6
47.2	595	47.2
35	755	35
21.1	654	21.1
30	608	30
46.4	600	46.4
44.5	589	44.5
46.5	908	46.5
22	378	22
40.7	413	40.7
49.4	706	49.4
25.4	341	25.4
42.6	923	42.6
32.7	820	32.7
17.3	1221	17.3
32.2	1321	32.2
31.2	1071.25	31.2
35.6	441	35.6
36.3	762	36.3
32.4	1259	32.4
37.2	931	37.2
35.3	984	35.3
31.35	588	31.35

39	536	39
44.8	429	44.8
27.9	684	27.9
	821	
	488	
15.8	929	31.6
29.9	1400	29.9
29.5	959	29.5
22.6	962	22.6
38.1	1100	38.1
29.6	1340	29.6
24.7	890	24.7
22.2	1090	22.2
17.1	789	17.1
33.2	1120	33.2
19.2	866	19.2
30.3	1220	30.3
35.8	1450	35.8
23.5	863	23.5
24.9	1154	24.9
32.6	1192	32.6
33	1126	33
21	1129	21
27.875	1150.25	27.875
26.9	1004	26.9
26.1	1130	26.1
26	1197	26
23.6	1228	23.6
25.65	1139.75	25.65
26.1	1314	26.1
28.5	1221	28.5
25.2	1036	25.2
24.6	1130	24.6
26.1	1175.25	26.1
26.54167	1155.083	26.54167
21.6	1140	21.6
13.2075	657.75	13.2075
16.2	591	16.2
22.2	723	22.2
	738	
	759	
2.36	543	4.72
36.7	1030	36.7
29.1	1040	29.1
28.4	944	28.4
39.4	1040	39.4
37.8	1240	37.8
32.2	903	32.2
15.5	1100	15.5
24.4	1030	24.4
30.2	892	30.2
15.9	848	15.9
38	893	38
41.5	1050	41.5
24.9	872	24.9

29.3	911	29.3
20	1156	20
17.3	1177	17.3
8.91	1279	8.91
18.8775	1130.75	18.8775
33.7	1066	33.7
27.4	1063	27.4
9.89	1192	9.89
6.46	1292	6.46
19.3625	1153.25	19.3625
29.1	1076	29.1
28.6	1075	28.6
25.5	1201	25.5
5.91	1306	5.91
22.2775	1164.5	22.2775
20.1725	1149.5	20.1725
25.5	823	25.5
22.1	1212	22.1
23.4	1237	23.4
17.5	1147	17.5
21	1198.667	21
20.25	1029.25	20.25
36.2	584	36.2
32.5	770	32.5
22.8	919	22.8
	890	
	816	
2.68	705	5.36
0.58	17.6	0.58
29.4	948	29.4
37.4	1110	37.4
17.6	666	17.6
73.3	1000	73.3
57.1	885	57.1
37.8	786	37.8
27	785	27
30.5	1020	30.5
49.2	775	49.2
25.3	859	25.3
65	839	65
64.4	796	64.4
52.4	752	52.4
29.8	968	29.8
18.3	1086	18.3
9.26	995	9.26
6.98	1222	6.98
16.085	1067.75	16.085
31	1068	31
24.4	1061	24.4
14.1	1032	14.1
6.54	1064	6.54
19.01	1056.25	19.01
25.6	1082	25.6
22	1081	22
14.1	931	14.1

9.45	1252	9.45
17.7875	1086.5	17.7875
17.6275	1070.167	17.6275
37.3	702	37.3
18.625	834	18.625
38.5	626	38.5
46.3	796	46.3
	622	
	714	
2.77	869	5.54
19.4	641	19.4
64.1	826	64.1
43.5	1121	43.5
42.33333	862.6667	42.33333
18.7	535	18.7
14.2	676	14.2
22.9	640	22.9
29.1	569	29.1
18	496	18
17.2	546	17.2
10.7	472	10.7
40	405	40
13.7	189	13.7
15.5	218	15.5
	197	
	200	
7.02	617	14.04
51.8	673	51.8
49.2	719	49.2
41.2	900	41.2
47.4	764	47.4
69.4	575	69.4
75.5	652	75.5
76.3	598	76.3
80	682	80
35.5	563	35.5
36.4	444	36.4
31.8	705	31.8
98.4	518	98.4
55.1	593	55.1
27.1	494	27.1
	632	
	559	
1.28	752	2.56
39.7	484	39.7
18.4	514	18.4
15.3	1160	15.3
24.46667	719.3333	24.46667
22.6	952	22.6
22.2	938	22.2
19.5	882	19.5
6.32	1230	6.32
61.1	284	61.1
43	266	43
32	216	32

	365	
	348	
3.47	267	6.94
24.3	304	24.3
14.5	161	14.5
24.4	198	24.4
15.1	180	15.1
13.3	258	13.3
8	761	8
4.34	588	4.34
10.185	446.75	10.185
13.2	241	13.2
35.6	245	35.6
10.1	470	10.1
7.19	664	7.19
17.63	459.6667	17.63
22.3	185	22.3
15.2	187	15.2
4.1	237	4.1
6.58	179	6.58
10.5	377	10.5
7.46	348	7.46
9.06	235	9.06
9.71	202	9.71
7.54	302	7.54
9.52	277	9.52
9.64	282	9.64
9.094	259.6	9.094
15.7	212	15.7
11.2	142	11.2
11.1	188	11.1
7.33	258	7.33
7.42	171	7.42
11.3	144	11.3
10	164	10
17.9	192	17.9
17.2	208	17.2
8.95	248	8.95
14.9	301	14.9
10.7	260	10.7
9.78	172	9.78
25.5	185	25.5
38.2	210	38.2
14.47867	203.6667	14.47867
1.45	29	1.45
1.12	10	1.12
6.8	203	6.8
3.123333	80.66667	3.123333
19.5	193	19.5
13.9	233	13.9
24	309	24
24.5	237	24.5
27.1	295	27.1
16.1	166	16.1
13.1	226	13.1

13.2	302	13.2
9.6	208	9.6
15.6	298	15.6
10	202	10
38.2	337	38.2
39.9	306	39.9
31	268	31
13.9	282	13.9
34.4	280	34.4
21.63333	263.2667	21.63333
28.8	189	28.8
37	183	37
17.1	140	17.1
22.5	222	22.5
17.7	194	17.7
16.9	182	16.9
31	188	31
12.7	184	12.7
28.4	206	28.4
13.3	247	13.3
28.7	243	28.7
32.5	260	32.5
37.5	218	37.5
17.8	196	17.8
23.1	238	23.1
24.33333	206	24.33333
5.83	134	5.83
6.93	131	6.93
	214	
	142	
23.4	179	23.4
11.3	150	11.3
7.75	128	7.75
12.1	136	12.1
17.3	176	17.3
19.9	161	19.9
16.6	246	16.6
31	201	31
8.67	175	8.67
16.44667	172.4444	16.44667
0.713	434	1.426
3.5	259	3.5
4.93	147	4.93
18.9	640	18.9
	529	
	76.2	
4.87	594	9.74
18	651	18
12	362	12
10.9	276	10.9
	309	
	467	
5.59	1163	11.18
25.8	880	25.8

13.3	502	13.3
11.5	483	11.5
	498	
	576	
18.8	927	37.6
25.7	742	25.7
9.07	274	9.07
12.5	382	12.5
	236	
	530	
6.65	1483	13.3
2.25	229	4.5
12.4	727	12.4
25.2	1030	25.2
6.45	371	6.45
21.1	603	21.1
9.15	420	9.15
8.29	752	8.29
4.91	242	4.91
4.2	320	4.2
19.2	319	19.2
3.57	214	3.57
7.1	299	7.1
9.73	221	9.73
19.9	405	19.9
6.055	300.25	6.055
0.232	36.8	0.464
11.2	1123	22.4
15.2925	186.5	15.2925
48.3	279	48.3
14.9	239	14.9
	126	
	125	
0.034	84.3	0.068
12.745	655.25	12.745
8.55	308	8.55
9.6	320	9.6
	552	
	635	
0.207	41.8	0.414
13.2267	238.5	13.2267
27.9	385	27.9
10.6	233	10.6
	295	
	427	
5.27	226	10.54
17.925	395.75	17.925
6.425	792.3	6.425
8.296	1180	8.296
4.372	1303	4.372
3.132	1332	3.132
1.97	1456	1.97
2.217	1420	2.217

1.756	1412	1.756
1.671	1406	1.671
2.03	567.2	2.03
1.676	1530	1.676
3.3545	1239.85	3.3545
20.637	951.4	20.637
13.6613	1183	13.6613
6.37649	1351	6.37649
5.47754	1334	5.47754
5.96428	1315	5.96428
4.22031	1093	4.22031
3.70674	1311	3.70674
1.63359	1105	1.63359
0.71726	457.1	0.71726
0.36079	281.8	0.36079
6.27553	1038.23	6.27553
14.1	958.729	14.1
17.2	986.468	17.2
20.5	1161.74	20.5
12.5	1153.2	12.5
7.62	1404.59	7.62
3.33352	1140.6	3.33352
4.86501	1662.13	4.86501
14.8	937.842	14.8
5.08887	1410.46	5.08887
4.78369	1587.34	4.78369
10.47911	1240.31	10.47911
17.6637	1168.56	17.6637
36.1446	1120.98	36.1446
37.3466	1753.5	37.3466
21.0903	1439.85	21.0903
12.1695	1391.38	12.1695
5.47465	1610.03	5.47465
5.10387	1525.24	5.10387
5.56929	1805.51	5.56929
5.84364	2048.13	5.84364
7.33758	2071.58	7.33758
15.37437	1593.476	15.37437
48.8846	1218.47	48.8846
33.163	983.987	33.163
7.14904	255.263	7.14904
2.65	218.539	2.65
44.8956	1107.81	44.8956
49.2118	1130.86	49.2118
40.7434	1113.28	40.7434
29.7668	1035.15	29.7668
31.8475	856.098	31.8475
1.49914	63.2895	1.49914
28.98109	798.2747	28.98109
36.8256	1120	36.8256
21.7769	1190	21.7769
18.095	1290	18.095

12.737	1570	12.737
12.502	1520	12.502
10.7306	1660	10.7306
11.0544	1640	11.0544
12.7981	1630	12.7981
12.2318	1860	12.2318
11.6738	1510	11.6738
16.04252	1499	16.04252
13.84	1004.8	13.84
12.6	948	12.6
9.28	1150	9.28
14	1550	14
	1040	
	663	
11.3	755	22.6

APPENDIX E-2
PROGRAM CODE FOR SEDIMENT STATISTICAL ANALYSES

```
### File created for analysis of SED data for SW/SED Report (2017)
### Resolved data quantity and longevity of data set to main locations corresponding with 2016 sampling locations.
### Note: crosstab file is exported for averaging of samples with multiple depths before being re-imported and used for
statistical analysis
### Code prepared by LSV 1/29/2017
### Code checked by NTG 2/14/2017
### Code revised 7/12/2017 by KPA

sink("Annual Report Stats.txt")
library(reshape) #for melt()
library(lattice) #for xyplot()
library(stringr) #for str_sub()
library(PMCMR) #for post-hoc Nemenyi test
library(Kendall) # for Kendall's Tau check on log linear regression

#penob.sed = read.csv("SED_XTAB_RAW_4.csv")
#summary(penob.sed)

#temp.sed = penob.sed[penob.sed$qc.code == "FS" &! (penob.sed$alt_loc == "DNU" | penob.sed$Reach ==
"Searsport"),]
#summary(temp.sed)

#temp.sed = temp.sed[,c(1:7,11,13,15,19)]
#write.csv(temp.sed, "p.sed.csv") #export data set to do averages of samples in excel

p.sed = read.csv("p.sed_July_2017_Rev.csv") # file brought back in once averages on samples done where depths are
provided
p.sed = p.sed[p.sed$use == "x",] # samples with only one depth or average of a set of samples was marked in excel with
an x in the "use" column

#next two lines copy adusted data cells into working data cells for THg and MeHg
p.sed$Mercury.NG.G.Result <- p.sed$Adj.Mercury.NG.G.Result
p.sed$Methyl.mercury.NG.G.Result <- p.sed$Adj.Methyl.mercury.NG.G.Result

p.sed$Date = as.Date(p.sed$Sample.date, format = "%m/%d/%Y")
p.sed$year = as.numeric(substring(p.sed$Date, 1, 4))
p.sed$month = as.numeric(substring(p.sed$Date, 6, 7))
p.sed$day = as.numeric(substring(p.sed$Date, 9, 10))

p.sed$Reach = factor(p.sed$Reach)
p.sed$u.d = "down"
p.sed$u.d[p.sed$Reach == "Veazie"] = "up"
p.sed$u.d = factor(p.sed$u.d)

p.sed$alt_loc = factor(p.sed$alt_loc)

p.sed$reach.facd = factor(p.sed$Reach, levels(p.sed$Reach)[c(6,4,2,3,8,7,5,1)]) #putting reaches in order of N to S
p.sed$alt.facd = factor(p.sed$alt_loc, levels(p.sed$alt_loc)[c
(9,7,8,26,6,10,13,12,11,27,29,28,14,17,18,19,20,21,16,15,4,22,25,24,23,5,1,2,3)])


summary(p.sed)


in.tid = p.sed[!substring(p.sed$Loc, 1,1) == "W" &! substring(p.sed$Loc, 1,3) == "E-0",]
in.tid$norm.Hg = in.tid$Mercury.NG.G.Result / in.tid$Total.Organic.Carbon.PERCENT.Result * median(in.tid
$Total.Organic.Carbon.PERCENT.Result)
in.tid$norm.MeHg = in.tid$Methyl.mercury.NG.G.Result / in.tid$Total.Organic.Carbon.PERCENT.Result * median(in.tid
$Total.Organic.Carbon.PERCENT.Result)

sub.ti = p.sed[substring(p.sed$Loc, 1,3) == "E-0",]
sub.ti$norm.Hg = sub.ti$Mercury.NG.G.Result / sub.ti$Total.Organic.Carbon.PERCENT.Result * median(sub.ti
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
sub.ti$norm.MeHg = sub.ti$Methyl.mercury.NG.G.Result / sub.ti$Total.Organic.Carbon.PERCENT.Result * median(sub.ti
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)

wetlnd = p.sed[substring(p.sed$Loc, 1,1) == "W",]
wetlnd$Reach = factor(wetlnd$Reach)
wetlnd$reach.facd = factor(wetlnd$reach.facd)
```

```
wetlnd$alt_loc = factor(wetlnd$alt_loc)
wetlnd$alt.facd = substring(wetlnd$alt.facd, 1, 4)
wetlnd$alt.facd = factor(wetlnd$alt.facd)
wetlnd$alt.facd = factor(wetlnd$alt.facd, levels(wetlnd$alt.facd)[c(4,1,5,2,3)])
wetlnd$norm.Hg = wetlnd$Mercury.NG.G.Result / wetlnd$Total.Organic.Carbon.PERCENT.Result * median(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
wetlnd$norm.MeHg = wetlnd$Methyl.mercury.NG.G.Result / wetlnd$Total.Organic.Carbon.PERCENT.Result * median
(wetlnd$Total.Organic.Carbon.PERCENT.Result, na.rm = T)


w.hi = wetlnd[str_sub(wetlnd$alt_loc,-4) == "High",]
w.hi$norm.Hg = w.hi$Mercury.NG.G.Result / w.hi$Total.Organic.Carbon.PERCENT.Result * median(w.hi
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.hi$norm.MeHg = w.hi$Methyl.mercury.NG.G.Result / w.hi$Total.Organic.Carbon.PERCENT.Result * median(w.hi
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.md = wetlnd[str_sub(wetlnd$alt_loc,-3) == "Mid",]
w.md$norm.Hg = w.md$Mercury.NG.G.Result / w.md$Total.Organic.Carbon.PERCENT.Result * median(w.md
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.md$norm.MeHg = w.md$Methyl.mercury.NG.G.Result / w.md$Total.Organic.Carbon.PERCENT.Result * median(w.md
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.lo = wetlnd[str_sub(wetlnd$alt_loc,-3) == "Low",]
w.lo$norm.Hg = w.lo$Mercury.NG.G.Result / w.lo$Total.Organic.Carbon.PERCENT.Result * median(w.lo
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.lo$norm.MeHg = w.lo$Methyl.mercury.NG.G.Result / w.lo$Total.Organic.Carbon.PERCENT.Result * median(w.lo
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.it = wetlnd[str_sub(wetlnd$alt_loc,-5) == "tidal",]
w.it$norm.Hg = w.it$Mercury.NG.G.Result / w.it$Total.Organic.Carbon.PERCENT.Result * median(w.it
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)
w.it$norm.MeHg = w.it$Methyl.mercury.NG.G.Result / w.it$Total.Organic.Carbon.PERCENT.Result * median(w.it
$Total.Organic.Carbon.PERCENT.Result, na.rm = T)


################
### Kruskal Wallis Tests (all types
# code modfied by KPA to gather stats in order of Table 4.1-1 appearance to aid QC
################

Table4_1_1 <- vector("list",18)

Table4_1_1[[1]] <- kruskal.test(sub.ti$Mercury.NG.G.Result ~ sub.ti$Reach)
Table4_1_1[[2]] <- kruskal.test(sub.ti$Methyl.mercury.NG.G.Result ~ sub.ti$Reach)
Table4_1_1[[3]] <- kruskal.test(sub.ti$Total.Organic.Carbon.PERCENT.Result ~ sub.ti$Reach)

Table4_1_1[[4]] <- kruskal.test(in.tid$Mercury.NG.G.Result ~ in.tid$Reach)
Table4_1_1[[5]] <- kruskal.test(in.tid$Methyl.mercury.NG.G.Result ~ in.tid$Reach)
Table4_1_1[[6]] <- kruskal.test(in.tid$Total.Organic.Carbon.PERCENT.Result ~ in.tid$Reach)


Table4_1_1[[7]] <- kruskal.test(Mercury.NG.G.Result ~ Reach, data = w.hi)
Table4_1_1[[8]] <- kruskal.test(Methyl.mercury.NG.G.Result ~ Reach, data = w.hi)
Table4_1_1[[9]] <- kruskal.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.hi)


Table4_1_1[[10]] <- kruskal.test(Mercury.NG.G.Result ~ Reach, data = w.md)
Table4_1_1[[11]] <- kruskal.test(Methyl.mercury.NG.G.Result ~ Reach, data = w.md)
Table4_1_1[[12]] <- kruskal.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.md)


Table4_1_1[[13]] <- kruskal.test(Mercury.NG.G.Result ~ Reach, data = w.lo)
Table4_1_1[[14]] <- kruskal.test(Methyl.mercury.NG.G.Result ~ Reach, data = w.lo)
Table4_1_1[[15]] <- kruskal.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.lo)


Table4_1_1[[16]] <- kruskal.test(Mercury.NG.G.Result ~ Reach, data = w.it)
Table4_1_1[[17]] <- kruskal.test(Methyl.mercury.NG.G.Result ~ Reach, data = w.it)
Table4_1_1[[18]] <- kruskal.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.it)


Table4_1_1.out <- as.data.frame(matrix(data = unlist(Table4_1_1[1:18]), nrow=18, ncol=5, byrow = TRUE))
```

```
print(Table4_1_1.out)
write.csv(Table4_1_1.out, "Table4_1_1.csv")


################
### SUBTIDAL ###
################


posthoc.kruskal.nemenyi.test(sub.ti$Mercury.NG.G.Result ~ sub.ti$Reach, dist = "Chisq") #post-hoc comparison for non-
parametric data
posthoc.kruskal.nemenyi.test(sub.ti$Methyl.mercury.NG.G.Result ~ sub.ti$Reach, dist = "Chisq") #post-hoc comparison
for non-parametric data
posthoc.kruskal.nemenyi.test(sub.ti$Total.Organic.Carbon.PERCENT.Result ~ sub.ti$Reach, dist = "Chisq") #post-hoc
comparison for non-parametric data


sub.ti.med.sum = data.frame(Hg = tapply(sub.ti$Mercury.NG.G.Result, factor(sub.ti$Reach), median, na.rm = TRUE))
sub.ti.med.sum$MeHg = tapply(sub.ti$Methyl.mercury.NG.G.Result, factor(sub.ti$Reach), median, na.rm = TRUE)
sub.ti.med.sum$TOC.perc = tapply(sub.ti$Total.Organic.Carbon.PERCENT.Result, factor(sub.ti$Reach), median, na.rm
= TRUE)


anova(lm(Mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * factor(Reach), data = sub.ti))
anova(lm(Mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result + factor(Reach), data = sub.ti))

anova(lm(Methyl.mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * factor(Reach), data = sub.ti))


pdf("sub.ti.Hg_MeHg_plots.pdf", paper = "USr")
boxplot(Mercury.NG.G.Result ~ factor(reach.facd), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal Sediment Mercury",
ylab = "Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(sub.ti$reach.facd))), levels(factor(sub.ti$reach.facd)), cex.axis = 0.65)

boxplot(Mercury.NG.G.Result ~ factor(alt_loc), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal Sediment Mercury", ylab
= "Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(sub.ti$alt.facd))), levels(factor(sub.ti$alt.facd)), cex.axis = 0.5)


boxplot(Methyl.mercury.NG.G.Result ~ factor(reach.facd), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal Sediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(sub.ti$reach.facd))), levels(factor(sub.ti$reach.facd)), cex.axis = 0.65)

boxplot(Methyl.mercury.NG.G.Result ~ factor(alt_loc), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal Sediment Methyl
Mercury", ylab = "Methyl Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(sub.ti$alt.facd))), levels(factor(sub.ti$alt.facd)), cex.axis = 0.5)


boxplot(Total.Organic.Carbon.PERCENT.Result ~ factor(reach.facd), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal
Sediment Total Organic Carbon", ylab = "TOC (%)")
axis(1, at = 1:length(levels(factor(sub.ti$reach.facd))), levels(factor(sub.ti$reach.facd)), cex.axis = 0.65)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ factor(alt_loc), data = sub.ti, xaxt = "n", las = 1, main = "Subtidal
Sediment Total Organic Carbon", ylab = "TOC (%)")
axis(1, at = 1:length(levels(factor(sub.ti$alt.facd))), levels(factor(sub.ti$alt.facd)), cex.axis = 0.5)

dev.off()


##################
### INTERTIDAL ###
##################


posthoc.kruskal.nemenyi.test(in.tid$Mercury.NG.G.Result ~ in.tid$Reach, dist="Chisq") #post-hoc comparison for non-
parametric data
posthoc.kruskal.nemenyi.test(in.tid$Methyl.mercury.NG.G.Result ~ in.tid$Reach, dist="Chisq") #post-hoc comparison for
non-parametric data
posthoc.kruskal.nemenyi.test(in.tid$Total.Organic.Carbon.PERCENT.Result ~ in.tid$Reach, dist="Chisq") #post-hoc
```

```
comparison for non-parametric data


in.tid.med.sum = data.frame(Hg = tapply(in.tid$Mercury.NG.G.Result, factor(in.tid$Reach), median, na.rm = TRUE))
in.tid.med.sum$MeHg = tapply(in.tid$Methyl.mercury.NG.G.Result, factor(in.tid$Reach), median, na.rm = TRUE)
in.tid.med.sum$TOC.perc = tapply(in.tid$Total.Organic.Carbon.PERCENT.Result, factor(in.tid$Reach), median, na.rm =
TRUE)



anova(lm(Mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * u.d, data = in.tid))

anova(lm(Methyl.mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * u.d, data = in.tid))

anova(lm(Mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * Reach, data = in.tid))

anova(lm(Methyl.mercury.NG.G.Result ~ Total.Organic.Carbon.PERCENT.Result * Reach, data = in.tid))


pdf("in.tid.Hg_MeHg_plots.pdf", paper = "USr")
boxplot(Mercury.NG.G.Result ~ factor(reach.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal Sediment Mercury",
ylab = "Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(in.tid$reach.facd))), levels(factor(in.tid$reach.facd)), cex.axis = 0.65)

boxplot(Mercury.NG.G.Result ~ factor(alt.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal Sediment Mercury",
ylab = "Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(in.tid$alt.facd))), levels(factor(in.tid$alt.facd)), cex.axis = 0.7)


boxplot(Methyl.mercury.NG.G.Result ~ factor(reach.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal Sediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(in.tid$reach.facd))), levels(factor(in.tid$reach.facd)), cex.axis = 0.65)

boxplot(Methyl.mercury.NG.G.Result ~ factor(alt.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal Sediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)")
axis(1, at = 1:length(levels(factor(in.tid$alt.facd))), levels(factor(in.tid$alt.facd)), cex.axis = 0.7)


boxplot(Total.Organic.Carbon.PERCENT.Result ~ factor(reach.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal
Sediment Total Organic Carbon", ylab = "TOC (%)")
axis(1, at = 1:length(levels(factor(in.tid$reach.facd))), levels(factor(in.tid$reach.facd)), cex.axis = 0.65)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ factor(alt.facd), data = in.tid, xaxt = "n", las = 1, main = "Intertidal
Sediment Total Organic Carbon", ylab = "TOC (%)")
axis(1, at = 1:length(levels(factor(in.tid$alt.facd))), levels(factor(in.tid$alt.facd)), cex.axis = 0.7)

dev.off()



################
### WETLANDS ###
################

print("Table4.1-11")
posthoc.kruskal.nemenyi.test(Mercury.NG.G.Result ~ Reach, data = w.lo, dist = "Chisq") #post-hoc comparison for non-
parametric data
posthoc.kruskal.nemenyi.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.lo, dist = "Chisq") #post-hoc
comparison for non-parametric data

print("Table 4.1-12")
posthoc.kruskal.nemenyi.test(Methyl.mercury.NG.G.Result ~ Reach, data = w.hi, dist = "Chisq") #post-hoc comparison
for non-parametric data
posthoc.kruskal.nemenyi.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.hi, dist = "Chisq") #post-hoc
comparison for non-parametric data

print("Table4.1-13")
posthoc.kruskal.nemenyi.test(Total.Organic.Carbon.PERCENT.Result ~ Reach, data = w.it, dist = "Chisq") #post-hoc
comparison for non-parametric data
```

```
wetlnd.mdn.sum = data.frame(hi.Hg = tapply(w.hi$Mercury.NG.G.Result, w.hi$Reach, median, na.rm = T))
wetlnd.mdn.sum$hi.Hg.x = tapply(w.hi$Methyl.mercury.NG.G.Result, w.hi$Reach, mean, na.rm = T)
wetlnd.mdn.sum$hi.MeHg = tapply(w.hi$Methyl.mercury.NG.G.Result, w.hi$Reach, median, na.rm = T)
wetlnd.mdn.sum$hi.MeHg.x = tapply(w.hi$Methyl.mercury.NG.G.Result, w.hi$Reach, mean, na.rm = T)
wetlnd.mdn.sum$hi.TOC.perc = tapply(w.hi$Total.Organic.Carbon.PERCENT.Result, w.hi$Reach, median, na.rm = T)
wetlnd.mdn.sum$hi.TOC.perc.x = tapply(w.hi$Total.Organic.Carbon.PERCENT.Result, w.hi$Reach, mean, na.rm = T)

wetlnd.mdn.sum$md.Hg = tapply(w.md$Mercury.NG.G.Result, w.md$Reach, median, na.rm = T)
wetlnd.mdn.sum$md.Hg.x = tapply(w.md$Mercury.NG.G.Result, w.md$Reach, mean, na.rm = T)
wetlnd.mdn.sum$md.MeHg = tapply(w.md$Methyl.mercury.NG.G.Result, w.md$Reach, median, na.rm = T)
wetlnd.mdn.sum$md.MeHg.x = tapply(w.md$Methyl.mercury.NG.G.Result, w.md$Reach, mean, na.rm = T)
wetlnd.mdn.sum$md.TOC.perc = tapply(w.md$Total.Organic.Carbon.PERCENT.Result, w.md$Reach, median, na.rm =
T)
wetlnd.mdn.sum$md.TOC.perc.x = tapply(w.md$Total.Organic.Carbon.PERCENT.Result, w.md$Reach, mean, na.rm =
T)

wetlnd.mdn.sum$lo.Hg = tapply(w.lo$Mercury.NG.G.Result, w.lo$Reach, median, na.rm = T)
wetlnd.mdn.sum$lo.Hg.x = tapply(w.lo$Mercury.NG.G.Result, w.lo$Reach, mean, na.rm = T)
wetlnd.mdn.sum$lo.MeHg = tapply(w.lo$Methyl.mercury.NG.G.Result, w.lo$Reach, median, na.rm = T)
wetlnd.mdn.sum$lo.MeHg.x = tapply(w.lo$Methyl.mercury.NG.G.Result, w.lo$Reach, mean, na.rm = T)
wetlnd.mdn.sum$lo.TOC.perc = tapply(w.lo$Total.Organic.Carbon.PERCENT.Result, w.lo$Reach, median, na.rm = T)
wetlnd.mdn.sum$lo.TOC.perc.x = tapply(w.lo$Total.Organic.Carbon.PERCENT.Result, w.lo$Reach, mean, na.rm = T)

wetlnd.mdn.sum$it.Hg = tapply(w.it$Mercury.NG.G.Result, w.it$Reach, median, na.rm = T)
wetlnd.mdn.sum$it.Hg.x = tapply(w.it$Mercury.NG.G.Result, w.it$Reach, mean, na.rm = T)
wetlnd.mdn.sum$it.MeHg = tapply(w.it$Methyl.mercury.NG.G.Result, w.it$Reach, median, na.rm = T)
wetlnd.mdn.sum$it.MeHg.x = tapply(w.it$Methyl.mercury.NG.G.Result, w.it$Reach, mean, na.rm = T)
wetlnd.mdn.sum$it.TOC.perc = tapply(w.it$Total.Organic.Carbon.PERCENT.Result, w.it$Reach, median, na.rm = T)
wetlnd.mdn.sum$it.TOC.perc.x = tapply(w.it$Total.Organic.Carbon.PERCENT.Result, w.it$Reach, mean, na.rm = T)


pdf("wetlnd.Hg_MeHg_plots.pdf", paper = "USr")
par(mfrow = c(2,2))
boxplot(Mercury.NG.G.Result ~ reach.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Mercury.NG.G.Result ~ reach.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Mercury.NG.G.Result ~ reach.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Mercury.NG.G.Result ~ reach.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)\nSediment
Mercury", ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)



par(mfrow = c(2,2))
boxplot(Mercury.NG.G.Result ~ alt.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Mercury.NG.G.Result ~ alt.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Mercury.NG.G.Result ~ alt.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)\nSediment Mercury", ylab
= "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Mercury.NG.G.Result ~ alt.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)\nSediment Mercury",
ylab = "Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Mercury.NG.G.Result, na.rm = T) * 1.02))
```

```
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)


par(mfrow = c(2,2))
boxplot(Methyl.mercury.NG.G.Result ~ reach.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Methyl.mercury.NG.G.Result ~ reach.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Methyl.mercury.NG.G.Result ~ reach.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Methyl.mercury.NG.G.Result ~ reach.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)


par(mfrow = c(2,2))
boxplot(Methyl.mercury.NG.G.Result ~ alt.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)\nSediment Methyl
Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm = T) *
1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Methyl.mercury.NG.G.Result ~ alt.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Methyl.mercury.NG.G.Result ~ alt.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)\nSediment Methyl
Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm = T) *
1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Methyl.mercury.NG.G.Result ~ alt.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)\nSediment
Methyl Mercury", ylab = "Methyl Mercury (ng/g)", yaxs = "i", ylim = c(0,max(wetlnd$Methyl.mercury.NG.G.Result, na.rm =
T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)


par(mfrow = c(2,2))
boxplot(Total.Organic.Carbon.PERCENT.Result ~ reach.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ reach.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ reach.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ reach.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:4, levels(factor(w.hi$reach.facd)), cex.axis = 0.5)
```

```
par(mfrow = c(2,2))
boxplot(Total.Organic.Carbon.PERCENT.Result ~ alt.facd, data = w.hi, xaxt = "n", las = 1, main = "Wetland (High)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ alt.facd, data = w.md, xaxt = "n", las = 1, main = "Wetland (Mid)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ alt.facd, data = w.lo, xaxt = "n", las = 1, main = "Wetland (Low)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

boxplot(Total.Organic.Carbon.PERCENT.Result ~ alt.facd, data = w.it, xaxt = "n", las = 1, main = "Wetland (Intertidal)
\nSediment Total Organic Carbon", ylab = "TOC (%)", yaxs = "i", ylim = c(0,max(wetlnd
$Total.Organic.Carbon.PERCENT.Result, na.rm = T) * 1.02))
axis(1, at = 1:5, levels(factor(w.hi$alt.facd)), cex.axis = 0.6)

dev.off()



########################
### LOGLINEAR trends ###
########################
# SUBTIDAL TEMPORAL TREND TEST
Table4_1_5 <- list(lmsum = summary(lm(log(Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",])))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc ==
"E-01-01",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-
03",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc ==
"E-01-03",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-
04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc ==
"E-01-04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",]))


# INTERTIDAL TEMPORAL PLOTS TREND TEST
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-
04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
"OV-04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-04",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-04",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-
01",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
"OV-01",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-01",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-01",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-
02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
```

```
"OV-02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-02",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OB-
05",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
"OB-05",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OB-05",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OB-05",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-
17-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc
== "W-17-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-
21-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc
== "W-21-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-
02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
"ES-02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-02",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "ES-02",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-
13",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc ==
"ES-13",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-13",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "ES-13",]))


# WETLAND TEMPORAL PLOTS TREND TEST


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-
21-UM-Central-C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc
== "W-21-UM-Central-C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
Central-C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
Central-C",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-
21-UM-East-C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc
== "W-21-UM-East-C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-
C",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
East-C",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-
21-UM-South",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc
== "W-21-UM-South",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
```

```
South",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.hi[w.hi$Loc == "W-21-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.hi[w.hi$Loc == "W-21-High",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.hi[w.hi$Loc == "W-63-High",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.hi[w.hi$Loc == "W-63-High",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Mid",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Mid",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.md[w.md$Loc == "W-21-Mid",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.md[w.md$Loc == "W-21-Mid",]))

Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.lo[w.lo$Loc == "W-21-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.lo[w.lo$Loc == "W-21-Low",]))


Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.Hg) ~ year, data = w.lo[w.lo$Loc == "W-17-Low",]))
Table4_1_5[[length(Table4_1_5)+1]] <- summary(lm(log(norm.MeHg) ~ year, data = w.lo[w.lo$Loc == "W-17-Low",]))

# Check same stats via Kendall's tau

Table4_1_5a <- list(ktaum = Kendall(sub.ti[sub.ti$Loc == "E-01-01",]$year, log(sub.ti[sub.ti$Loc == "E-01-01",]$Mercury.NG.G.Result)))
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-01",]$year, sub.ti[sub.ti$Loc == "E-01-01",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-01",]$year, sub.ti[sub.ti$Loc == "E-01-01",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-01",]$year, sub.ti[sub.ti$Loc == "E-01-01",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-03",]$year, sub.ti[sub.ti$Loc == "E-01-03",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-03",]$year, sub.ti[sub.ti$Loc == "E-01-03",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-03",]$year, sub.ti[sub.ti$Loc == "E-01-03",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-03",]$year, sub.ti[sub.ti$Loc == "E-01-03",]$norm.MeHg)
```

```
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-04",]$year, sub.ti[sub.ti$Loc == "E-01-04",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-04",]$year, sub.ti[sub.ti$Loc == "E-01-04",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-04",]$year, sub.ti[sub.ti$Loc == "E-01-04",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( sub.ti[sub.ti$Loc == "E-01-04",]$year, sub.ti[sub.ti$Loc == "E-01-04",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-04",]$year, in.tid[in.tid$Loc == "OV-04",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-04",]$year, in.tid[in.tid$Loc == "OV-04",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-04",]$year, in.tid[in.tid$Loc == "OV-04",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-04",]$year, in.tid[in.tid$Loc == "OV-04",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-01",]$year, in.tid[in.tid$Loc == "OV-01",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-01",]$year, in.tid[in.tid$Loc == "OV-01",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-01",]$year, in.tid[in.tid$Loc == "OV-01",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-01",]$year, in.tid[in.tid$Loc == "OV-01",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-02",]$year, in.tid[in.tid$Loc == "OV-02",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-02",]$year, in.tid[in.tid$Loc == "OV-02",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-02",]$year, in.tid[in.tid$Loc == "OV-02",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OV-02",]$year, in.tid[in.tid$Loc == "OV-02",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OB-05",]$year, in.tid[in.tid$Loc == "OB-05",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OB-05",]$year, in.tid[in.tid$Loc == "OB-05",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OB-05",]$year, in.tid[in.tid$Loc == "OB-05",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "OB-05",]$year, in.tid[in.tid$Loc == "OB-05",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-17-Intertidal",]$year, wetlnd[wetlnd$Loc ==
"W-17-Intertidal",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-17-Intertidal",]$year, wetlnd[wetlnd$Loc ==
"W-17-Intertidal",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.it[w.it$Loc == "W-17-Intertidal",]$year, w.it[w.it$Loc == "W-17-
Intertidal",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.it[w.it$Loc == "W-17-Intertidal",]$year, w.it[w.it$Loc == "W-17-
Intertidal",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Intertidal",]$year, wetlnd[wetlnd$Loc ==
"W-21-Intertidal",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Intertidal",]$year, wetlnd[wetlnd$Loc ==
"W-21-Intertidal",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.it[w.it$Loc == "W-21-Intertidal",]$year, w.it[w.it$Loc == "W-21-
Intertidal",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.it[w.it$Loc == "W-21-Intertidal",]$year, w.it[w.it$Loc == "W-21-
Intertidal",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-02",]$year, in.tid[in.tid$Loc == "ES-02",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-02",]$year, in.tid[in.tid$Loc == "ES-02",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-02",]$year, in.tid[in.tid$Loc == "ES-02",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-02",]$year, in.tid[in.tid$Loc == "ES-02",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-13",]$year, in.tid[in.tid$Loc == "ES-13",]
$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-13",]$year, in.tid[in.tid$Loc == "ES-13",]
$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-13",]$year, in.tid[in.tid$Loc == "ES-13",]
```

```
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( in.tid[in.tid$Loc == "ES-13",]$year, in.tid[in.tid$Loc == "ES-13",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-Central-C",]$year, wetlnd[wetlnd
$Loc == "W-21-UM-Central-C",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-Central-C",]$year, wetlnd[wetlnd
$Loc == "W-21-UM-Central-C",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-Central-C",]$year, wetlnd[wetlnd
$Loc == "W-21-UM-Central-C",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-Central-C",]$year, wetlnd[wetlnd
$Loc == "W-21-UM-Central-C",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-East-C",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-East-C",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-East-C",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-East-C",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-East-C",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-East-C",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-East-C",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-East-C",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-South",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-South",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-South",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-South",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-South",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-South",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-South",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-South",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-West-A",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-West-A",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-West-A",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-West-A",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-West-A",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-West-A",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-UM-West-A",]$year, wetlnd[wetlnd$Loc
== "W-21-UM-West-A",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-High",]$year, wetlnd[wetlnd$Loc == "W-
21-High",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-High",]$year, wetlnd[wetlnd$Loc == "W-
21-High",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.hi[w.hi$Loc == "W-21-High",]$year, w.hi[w.hi$Loc == "W-21-High",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.hi[w.hi$Loc == "W-21-High",]$year, w.hi[w.hi$Loc == "W-21-High",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-63-High",]$year, wetlnd[wetlnd$Loc == "W-
63-High",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-63-High",]$year, wetlnd[wetlnd$Loc == "W-
63-High",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.hi[w.hi$Loc == "W-63-High",]$year, w.hi[w.hi$Loc == "W-63-High",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.hi[w.hi$Loc == "W-63-High",]$year, w.hi[w.hi$Loc == "W-63-High",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Mid",]$year, wetlnd[wetlnd$Loc == "W-
21-Mid",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Mid",]$year, wetlnd[wetlnd$Loc == "W-
21-Mid",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.md[w.md$Loc == "W-21-Mid",]$year, w.md[w.md$Loc == "W-21-
Mid",]$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.md[w.md$Loc == "W-21-Mid",]$year, w.md[w.md$Loc == "W-21-
Mid",]$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Low",]$year, wetlnd[wetlnd$Loc == "W-
21-Low",]$Mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-21-Low",]$year, wetlnd[wetlnd$Loc == "W-
21-Low",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.lo[w.lo$Loc == "W-21-Low",]$year, w.lo[w.lo$Loc == "W-21-Low",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.lo[w.lo$Loc == "W-21-Low",]$year, w.lo[w.lo$Loc == "W-21-Low",]
$norm.MeHg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-17-Low",]$year, wetlnd[wetlnd$Loc == "W-
17-Low",]$Mercury.NG.G.Result)
```

```
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( wetlnd[wetlnd$Loc == "W-17-Low",]$year, wetlnd[wetlnd$Loc == "W-
17-Low",]$Methyl.mercury.NG.G.Result)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.lo[w.lo$Loc == "W-17-Low",]$year, w.lo[w.lo$Loc == "W-17-Low",]
$norm.Hg)
Table4_1_5a[[length(Table4_1_5a)+1]] <- Kendall( w.lo[w.lo$Loc == "W-17-Low",]$year, w.lo[w.lo$Loc == "W-17-Low",]
$norm.MeHg)


Table4_1_5.out <- data.frame(
Station = toString(Table4_1_5[[1]]$call[3]),
Param =  toString(Table4_1_5[[1]]$call[2]),
Intercept = coef(Table4_1_5[[1]])["(Intercept)","Estimate"],
year = coef(Table4_1_5[[1]])["year","Pr(>|t|)"],
r.squared = as.numeric(Table4_1_5[[1]]$r.squared),
p =coef(Table4_1_5[[1]])["year","Pr(>|t|)"],
seintercept = coef(Table4_1_5[[1]])["(Intercept)","Std. Error"],
seyear = coef(Table4_1_5[[1]])["year","Std. Error"],
ktau = as.numeric(Table4_1_5a[[1]][1]),
ktaup = as.numeric(Table4_1_5a[[1]][2]),
stringsAsFactors=FALSE
                        )

for (i in 2:length(Table4_1_5)) {

Table4_1_5.out[i,1] <- toString(Table4_1_5[[i]]$call[3])
Table4_1_5.out[i,2] <- toString(Table4_1_5[[i]]$call[2])
Table4_1_5.out[i,3] <- coef(Table4_1_5[[i]])["(Intercept)","Estimate"]
Table4_1_5.out[i,4] <- coef(Table4_1_5[[i]])["year","Estimate"]
Table4_1_5.out[i,5] <- as.numeric(Table4_1_5[[i]]$r.squared)
Table4_1_5.out[i,6] <- coef(Table4_1_5[[i]])["year","Pr(>|t|)"]
Table4_1_5.out[i,7] <- coef(Table4_1_5[[i]])["(Intercept)","Std. Error"]
Table4_1_5.out[i,8] <- coef(Table4_1_5[[i]])["year","Std. Error"]
Table4_1_5.out[i,9] <- as.numeric(Table4_1_5a[[i]][1])
Table4_1_5.out[i,10] <- as.numeric(Table4_1_5a[[i]][2])
                         }

write.csv(Table4_1_5.out, "Table4_1_5.csv")
pdf("LN_temporal_Hg_MeHg_plots.pdf", paper = "USr")

# SUBTIDAL TEMPORAL PLOTS
par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i', pch = 16)
plot((Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",], ylim = c(min((sub.ti$Mercury.NG.G.Result),
na.rm = T) * 0.89, max((sub.ti$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury (ng/g)", main = "E-01-
01")

plot((Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",], ylim = c(min((sub.ti$Mercury.NG.G.Result),
na.rm = T) * 0.89, max((sub.ti$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury (ng/g)", main = "E-01-
03")

plot((Mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",], ylim = c(min((sub.ti$Mercury.NG.G.Result),
na.rm = T) * 0.89, max((sub.ti$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury (ng/g)", main = "E-01-
04")

par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",], ylim = c(min((sub.ti
$Methyl.mercury.NG.G.Result), na.rm = T) * 0.89, max((sub.ti$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab =
"", ylab = "Methyl Mercury (ng/g)", main = "E-01-01")

plot((Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",], ylim = c(min((sub.ti
$Methyl.mercury.NG.G.Result), na.rm = T) * 0.89, max((sub.ti$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab =
"", ylab = "Methyl Mercury (ng/g)", main = "E-01-03")

plot((Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",], ylim = c(min((sub.ti
$Methyl.mercury.NG.G.Result), na.rm = T) * 0.89, max((sub.ti$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab =
"", ylab = "Methyl Mercury (ng/g)", main = "E-01-04")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-
04",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-
04",]),data.frame(year= 2006:2016), interval="confidence")[,2]), lty=2)
```

```
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = sub.ti[sub.ti$Loc == "E-01-
04",]),data.frame(year= 2006:2016), interval="confidence")[,3]), lty=2)
# Lines call above draws 95% confidence interval of regression

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


# NORMALIZED SUBTIDAL TEMPORAL PLOTS
par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",], ylim = c(min((sub.ti$norm.Hg), na.rm = T) * 0.89, max
((sub.ti$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "E-01-01")

plot((norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",], ylim = c(min((sub.ti$norm.Hg), na.rm = T) * 0.89, max
((sub.ti$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "E-01-03")

plot((norm.Hg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",], ylim = c(min((sub.ti$norm.Hg), na.rm = T) * 0.89, max
((sub.ti$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "E-01-04")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-01",], ylim = c(min((sub.ti$norm.MeHg), na.rm = T) * 0.89,
max((sub.ti$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "E-01-01")

plot((norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-03",], ylim = c(min((sub.ti$norm.MeHg), na.rm = T) * 0.89,
max((sub.ti$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "E-01-03")

plot((norm.MeHg) ~ year, data = sub.ti[sub.ti$Loc == "E-01-04",], ylim = c(min((sub.ti$norm.MeHg), na.rm = T) * 0.89,
max((sub.ti$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "E-01-04")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


# INTERTIDAL TEMPORAL PLOTS
in.tid.max.hg.ln = max((in.tid$Mercury.NG.G.Result[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04"
| in.tid$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$Mercury.NG.G.Result[w.it$Loc=="W-17-
Intertidal" | w.it$Loc=="W-21-Intertidal"] ,na.rm = T)
in.tid.min.hg.ln = min((in.tid$Mercury.NG.G.Result[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04" |
in.tid$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$Mercury.NG.G.Result[w.it$Loc=="W-17-
Intertidal" | w.it$Loc=="W-21-Intertidal"] ,na.rm = T)

par(mfrow = c(2,3), las = 1, tck = 0.015, yaxs = 'i')
plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-04",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "OV-04")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-04",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-04",]),data.frame(year=
2006:2016), interval="confidence")[,2]), lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-04",]),data.frame(year=
2006:2016), interval="confidence")[,3]), lty=2)

plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-01",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "OV-01")

plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-02",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "OV-02")

plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OB-05",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "OB-05")

plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-02",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "ES-02")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
```

```
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year=
2006:2016), interval="confidence")[,2]), lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year=
2006:2016), interval="confidence")[,3]), lty=2)


plot((Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-13",], ylim = c(0.89 * in.tid.min.hg.ln, in.tid.max.hg.ln *
1.02), xlab = "", ylab = "Mercury (ng/g)", main = "ES-13")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-13",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-13",]),data.frame(year=
2006:2016), interval="confidence")[,2]), lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-13",]),data.frame(year=
2006:2016), interval="confidence")[,3]), lty=2)

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


in.tid.max.me.ln = max((in.tid$Methyl.mercury.NG.G.Result[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc ==
"OV-04" | in.tid$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$Methyl.mercury.NG.G.Result[w.it
$Loc=="W-17-Intertidal" | w.it$Loc=="W-21-Intertidal"] ,na.rm = T)
in.tid.min.me.ln = min((in.tid$Methyl.mercury.NG.G.Result[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc ==
"OV-04" | in.tid$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$Methyl.mercury.NG.G.Result[w.it
$Loc=="W-17-Intertidal" | w.it$Loc=="W-21-Intertidal"] ,na.rm = T)

par(mfrow = c(2,3), las = 1, tck = 0.015, yaxs = 'i')
plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-04",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "OV-04")

plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-01",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "OV-01")

plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OV-02",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "OV-02")

plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "OB-05",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "OB-05")


plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-02",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "ES-02")

plot((Methyl.mercury.NG.G.Result) ~ year, data = in.tid[in.tid$Loc == "ES-13",], ylim = c(0.89 * in.tid.min.me.ln,
in.tid.max.me.ln * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "ES-13")

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)



# NORMALIZED INTERTIDAL TEMPORAL PLOTS
in.tid.max.nhg.ln = max((in.tid$norm.Hg[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04" | in.tid$Loc
== "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$norm.Hg[w.it$Loc == "W-17-Intertidal" | w.it$Loc == "W-
21-Intertidal"], na.rm = T)
in.tid.min.nhg.ln = min((in.tid$norm.Hg[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04" | in.tid$Loc
== "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]),w.it$norm.Hg[w.it$Loc == "W-17-Intertidal" | w.it$Loc == "W-
21-Intertidal"], na.rm = T)

par(mfrow = c(2,3), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-04",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
= "", ylab = "Normalized Mercury (ng/g)", main = "OV-04")

plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-01",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
```

```
= "", ylab = "Normalized Mercury (ng/g)", main = "OV-01")

plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OV-02",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
= "", ylab = "Normalized Mercury (ng/g)", main = "OV-02")

plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "OB-05",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
= "", ylab = "Normalized Mercury (ng/g)", main = "OB-05")

plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-02",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
= "", ylab = "Normalized Mercury (ng/g)", main = "ES-02")
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year= 2006:2016),
interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year= 2006:2016),
interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-02",]),data.frame(year= 2006:2016),
interval="confidence")[,3]),lty=2)


plot((norm.Hg) ~ year, data = in.tid[in.tid$Loc == "ES-13",], ylim = c(0.89 * in.tid.min.nhg.ln, in.tid.max.nhg.ln * 1.02), xlab
= "", ylab = "Normalized Mercury (ng/g)", main = "ES-13")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)

in.tid.max.nme.ln = max((in.tid$norm.MeHg[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04" | in.tid
$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]), w.it$norm.MeHg[w.it$Loc == "W-17-Intertidal" | w.it
$Loc == "W-21-Intertidal"], na.rm = T)
in.tid.min.nme.ln = min((in.tid$norm.MeHg[in.tid$Loc == "OV-01" | in.tid$Loc == "OV-02" | in.tid$Loc == "OV-04" | in.tid
$Loc == "OB-05" | in.tid$Loc == "ES-02" | in.tid$Loc == "ES-13"]), w.it$norm.MeHg[w.it$Loc == "W-17-Intertidal" | w.it
$Loc == "W-21-Intertidal"], na.rm = T)


par(mfrow = c(2,3), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-04",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "OV-04")

plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-01",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "OV-01")

plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OV-02",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "OV-02")

plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "OB-05",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "OB-05")

plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "ES-02",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "ES-02")

plot((norm.MeHg) ~ year, data = in.tid[in.tid$Loc == "ES-13",], ylim = c(0.89 * in.tid.min.nme.ln, in.tid.max.nme.ln * 1.02),
xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "ES-13")



# WETLAND TEMPORAL PLOTS
par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Intertidal",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-Intertidal")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame
(year= 2006:2016), interval="confidence")[,2]), lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame
(year= 2006:2016), interval="confidence")[,3]), lty=2)

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-Low")
```

```
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame
(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame
(year= 2006:2016), interval="confidence")[,3]),lty=2)

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Mid",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-Mid")

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-High")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)



par(mfrow = c(1,2), las = 1, tck = 0.015, yaxs = 'i')

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Intertidal",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-17-Intertidal")

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-17-Low")

par(mfrow = c(1,1), las = 1, tck = 0.015, yaxs = 'i')
plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-63-High")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",]),data.frame
(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",]),data.frame
(year= 2006:2016), interval="confidence")[,3]),lty=2)

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-Central-C",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-UM-Central-C")

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-UM-East-C")

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-UM-South")
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
South",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
South",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
South",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)

plot((Mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",], ylim = c(0.89 * min((wetlnd
$Mercury.NG.G.Result), na.rm = T), max((wetlnd$Mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Mercury
(ng/g)", main = "W-21-UM-West-A")
```

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title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95% confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')

plot((Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",], ylim = c(0.89 * min((w.it$Methyl.mercury.NG.G.Result), na.rm = T), max((w.it$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-21-Intertidal")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)


plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",], ylim = c(0.89 * min((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-21-Low")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)

plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Mid",], ylim = c(0.89 * min((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-21-Mid")

plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",], ylim = c(0.89 * min((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-21-High")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-High",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)


title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95% confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-transformed for clarity.",cex=0.7),outer=T,line=-1)

par(mfrow = c(1,2), las = 1, tck = 0.015, yaxs = 'i')

plot((Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",], ylim = c(0.89 * min((w.it$Methyl.mercury.NG.G.Result), na.rm = T), max((w.it$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-17-Intertidal")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)


plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",], ylim = c(0.89 * min((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab = "Methyl Mercury (ng/g)", main = "W-17-Low")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)
```

```
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(1,1), las = 1, tck = 0.015, yaxs = 'i')
plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",], ylim = c(0.89 * min((wetlnd
$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab
= "Methyl Mercury (ng/g)", main = "W-63-High")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-
High",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-
High",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-63-
High",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-Central-C",], ylim = c(0.89 * min
((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab =
"", ylab = "Methyl Mercury (ng/g)", main = "W-21-UM-Central-C")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
Central-C",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
Central-C",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-
Central-C",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)


plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",], ylim = c(0.89 * min((wetlnd
$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab
= "Methyl Mercury (ng/g)", main = "W-21-UM-East-C")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-
C",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-
C",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-
C",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)

plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",], ylim = c(0.89 * min((wetlnd
$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab
= "Methyl Mercury (ng/g)", main = "W-21-UM-South")

plot((Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",], ylim = c(0.89 * min((wetlnd
$Methyl.mercury.NG.G.Result), na.rm = T), max((wetlnd$Methyl.mercury.NG.G.Result), na.rm = T) * 1.02), xlab = "", ylab
= "Methyl Mercury (ng/g)", main = "W-21-UM-West-A")
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-
A",]),data.frame(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-
A",]),data.frame(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(Methyl.mercury.NG.G.Result) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-
A",]),data.frame(year= 2006:2016), interval="confidence")[,3]),lty=2)

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)



# NORMALIZED WETLAND TEMPORAL PLOTS
par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')

plot((norm.Hg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-Intertidal")
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
2006:2016), interval="confidence")[,2]),lty=2)
```

```
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
2006:2016), interval="confidence")[,3]),lty=2)

plot((norm.Hg) ~ year, data = w.lo[w.lo$Loc == "W-21-Low",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-Low")
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,3]),lty=2)


plot((norm.Hg) ~ year, data = w.md[w.md$Loc == "W-21-Mid",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-Mid")

plot((norm.Hg) ~ year, data = w.hi[w.hi$Loc == "W-21-High",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-High")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(1,2), las = 1, tck = 0.015, yaxs = 'i')

plot((norm.Hg) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-17-Intertidal")

plot((norm.Hg) ~ year, data = w.lo[w.lo$Loc == "W-17-Low",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-17-Low")


par(mfrow = c(1,1), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.Hg) ~ year, data = w.hi[w.hi$Loc == "W-63-High",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm = T), max
((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-63-High")


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-Central-C",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm
= T), max((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-UM-Central-
C")

plot((norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm =
T), max((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-UM-East-C")

plot((norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm =
T), max((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-UM-South")
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame(year=
2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame(year=
2006:2016), interval="confidence")[,3]),lty=2)

plot((norm.Hg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",], ylim = c(0.89 * min((wetlnd$norm.Hg), na.rm =
T), max((wetlnd$norm.Hg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Mercury (ng/g)", main = "W-21-UM-West-A")

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)



par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')

plot((norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm = T),
max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-21-
Intertidal")
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
```

```
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-21-Intertidal",]),data.frame(year=
2006:2016), interval="confidence")[,3]),lty=2)

plot((norm.MeHg) ~ year, data = w.lo[w.lo$Loc == "W-21-Low",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm = T),
max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-21-Low")
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-Low",]),data.frame(year=
2006:2016), interval="confidence")[,3]),lty=2)


plot((norm.MeHg) ~ year, data = w.md[w.md$Loc == "W-21-Mid",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm = T),
max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-21-Mid")

plot((norm.MeHg) ~ year, data = w.hi[w.hi$Loc == "W-21-High",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm = T),
max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-21-High")
title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)


par(mfrow = c(1,2), las = 1, tck = 0.015, yaxs = 'i')

plot((norm.MeHg) ~ year, data = w.it[w.it$Loc == "W-17-Intertidal",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm = T),
max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-17-
Intertidal")

plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-17-Low",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm =
T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-17-
Low")


par(mfrow = c(1,1), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-63-High",], ylim = c(0.89 * min((wetlnd$norm.MeHg), na.rm =
T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main = "W-63-
High")


par(mfrow = c(2,2), las = 1, tck = 0.015, yaxs = 'i')
plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-Central-C",], ylim = c(0.89 * min((wetlnd$norm.MeHg),
na.rm = T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main =
"W-21-UM-Central-C")

plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",], ylim = c(0.89 * min((wetlnd$norm.MeHg),
na.rm = T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main =
"W-21-UM-East-C")
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",]),data.frame
(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-East-C",]),data.frame
(year= 2006:2016), interval="confidence")[,3]),lty=2)

plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",], ylim = c(0.89 * min((wetlnd$norm.MeHg),
na.rm = T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main =
"W-21-UM-South")
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame
(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-South",]),data.frame
(year= 2006:2016), interval="confidence")[,3]),lty=2)
```

```
plot((norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",], ylim = c(0.89 * min((wetlnd$norm.MeHg),
na.rm = T), max((wetlnd$norm.MeHg), na.rm = T) * 1.02), xlab = "", ylab = "Normalized Methyl Mercury (ng/g)", main =
"W-21-UM-West-A")
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]),data.frame
(year= 2006:2016), interval="confidence")[,1]))
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]),data.frame
(year= 2006:2016), interval="confidence")[,2]),lty=2)
lines(2006:2016,exp(predict(lm(log(norm.MeHg) ~ year, data = wetlnd[wetlnd$Loc == "W-21-UM-West-A",]),data.frame
(year= 2006:2016), interval="confidence")[,3]),lty=2)

title(sub=list("Line indicates regression slope is significantly different than 0 (p<0.05). Dashed lines indicate 95%
confidence interval of regression. \n Regressions performed on log-transfmormed data, but data are presented un-
transformed for clarity.",cex=0.7),outer=T,line=-1)

print("Table 4.1-2")
mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Fort Point Cove"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Fort Point Cove"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Fort Point Cove"], na.rm=TRUE)
mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Upper Penobscot Bay"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Upper Penobscot Bay"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Upper Penobscot Bay"], na.rm=TRUE)

print("Table 4.1-7")
mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Veazie"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Veazie"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Veazie"], na.rm=TRUE)
mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Orrington"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Orrington"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Orrington"], na.rm=TRUE)

mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Verona East"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Verona East"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Verona East"], na.rm=TRUE)
mean(p.sed$Mercury.NG.G.Result[p.sed$Reach == "Verona Northeast"], na.rm=TRUE)
mean(p.sed$Methyl.mercury.NG.G.Result[p.sed$Reach == "Verona Northeast"], na.rm=TRUE)
mean(p.sed$Total.Organic.Carbon.PERCENT.Result[p.sed$Reach == "Verona Northeast"], na.rm=TRUE)

write.csv(wetlnd.mdn.sum,"Table4_10.csv")


dev.off()
sink()
```

APPENDIX E-3
SURFACE WATER DATA USED IN STATISTICAL ANALYSES

Location	Reach	Sample.Date	text.date	Sample.ID	use	Top.Depth	Bottom.De|	QC.Code
ES-15	Verona West	8/3/2006	8/3/2006	ES-15		1	1	FS
ES-15	Verona West	8/4/2006	8/4/2006	ES-15		1	1	FS
ES-15	Verona West	8/4/2006	8/4/2006	ES-15-UF		1	1	FS
ES-15	Verona West	8/4/2006	8/4/2006	ES-15	x			
ES-15	Verona West	9/8/2006	9/8/2006	ES15-SW	x	1	1	FS
ES-15	Verona West	9/29/2006	9/29/2006	ES 15	x	1	1	FS
ES-15	Verona West	10/24/2006	10/24/2006	ES15	x	1	1	FS
ES-15	Verona West	6/1/2007	6/1/2007	ES15-SW-I	x	1	1	FS
ES-15	Verona West	7/11/2007	7/11/2007	ES15-SW-I	x	1	1	FS
ES-15	Verona West	5/26/2016	5/26/2016	ES-15_052	x	1	1	FS
ES-15	Verona West	6/29/2016	6/29/2016	ES-15_062	x	1	1	FS
ES-15	Verona West	7/18/2016	7/18/2016	ES-15_071	x	1	1	FS
ES-15	Verona West	8/29/2016	8/29/2016	ES-15_082	x	1	1	FS
ES-15	Verona West	9/26/2016	9/26/2016	ES-15_092	x	1	1	FS
ES-15	Verona West	10/26/2016	10/26/2016	ES-15_102	x	1	1	FS
OV-02	Veazie	8/3/2006	8/3/2006	OV-02		1	1	FS
OV-02	Veazie	8/3/2006	8/3/2006	OV-2		1	1	FS
OV-02	Veazie	8/3/2006	8/3/2006	OV-2	x			
OV-02	Veazie	9/11/2006	9/11/2006	OV2-SW	x	1	1	FS
OV-02	Veazie	10/3/2006	10/3/2006	OV-2	x	1	1	FS
OV-02	Veazie	10/23/2006	10/23/2006	OV-2	x	1	1	FS
OV-02	Veazie	5/31/2007	5/31/2007	OV2 -SW-I	x	1	1	FS
OV-02	Veazie	7/11/2007	7/11/2007	OV2-SW-F	x	1	1	FS
PRVZ	Bangor	10/15/2010	10/15/2010	PRVZ-101510		NA	NA	FS
Veazie	Bangor	10/15/2010	10/15/2010	VZDAM-101510		NA	NA	FS
Veazie	Bangor	10/15/2010	10/15/2010	PRVZ_VZI	x			
PRVZ	Bangor	10/18/2010	10/18/2010	PRVZ-101	x	NA	NA	FS
Veazie	Bangor	11/9/2010	11/9/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/10/2010	11/10/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/11/2010	11/11/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/12/2010	11/12/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/13/2010	11/13/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/15/2010	11/15/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/17/2010	11/17/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/18/2010	11/18/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/19/2010	11/19/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/20/2010	11/20/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/22/2010	11/22/2010	VZDAM-11	x	NA	NA	FS
Veazie	Bangor	11/24/2010	11/24/2010	VZDAM-11	x	NA	NA	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-0.2F-070611		1	1	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-0.45F-070611		1	1	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-1F-070611		1	1	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-5F-070611		1	1	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-63F-070611		1	1	FS
1VZD	Bangor	7/6/2011	7/6/2011	1VZD-UF-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-0.2F-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-0.45F-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-1F-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-5F-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-63F-070611		1	1	FS
2VZD	Bangor	7/6/2011	7/6/2011	2VZD-UF-070611		1	1	FS
Veazie	Bangor	7/6/2011	7/6/2011	VZD-UF-070611*		NA	NA	FS
1VZD	Bangor	8/2/2011	8/2/2011	1VZD-0.2F-08022011		1	1	FS
Veazie	Bangor	7/6/2011	7/6/2011	1VZD_2VZ	x			

1VZD	Bangor	8/2/2011	8/2/2011	1VZD-0.45-08022011		1	1	FS
1VZD	Bangor	8/2/2011	8/2/2011	1VZD-0.45FG-080211		1	1	FS
1VZD	Bangor	8/2/2011	8/2/2011	1VZD-1F-08022011		1	1	FS
1VZD	Bangor	8/2/2011	8/2/2011	1VZD-63F-08022011		1	1	FS
1VZD	Bangor	8/2/2011	8/2/2011	1VZD-UF-08022011		1	1	FS
2VZD	Bangor	8/2/2011	8/2/2011	2VZD-0.2F-08022011		1	1	FS
2VZD	Bangor	8/2/2011	8/2/2011	2VZD-0.45F-0802201		1	1	FS
2VZD	Bangor	8/2/2011	8/2/2011	2VZD-1F-08022011		1	1	FS
2VZD	Bangor	8/2/2011	8/2/2011	2VZD-63F-08022011		1	1	FS
2VZD	Bangor	8/2/2011	8/2/2011	2VZD-UF-08022011		1	1	FS
Veazie	Bangor	8/2/2011	8/2/2011	1VZD_2VZ	x			
Veazie	Bangor	8/27/2011	8/27/2011	VZD-0827	x	NA	NA	FS
Veazie	Bangor	8/29/2011	8/29/2011	VZD-0829	x	NA	NA	FS
Veazie	Bangor	8/30/2011	8/30/2011	VZD-0830	x	NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 0-FF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 0-FF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 0-UF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 0-UF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 100-FF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 100-FF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 100-UF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 100-UF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 50-FF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 50-FF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 50-UF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 50-UF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 70-FF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 70-FF-UF36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 70-UF-F36		NA	NA	FS
IRW	Bangor	9/1/2011	9/1/2011	IRW 70-UF-UF36		NA	NA	FS
RW	Bangor	9/1/2011	9/1/2011	RW 70-FF-MF		NA	NA	FS
RW	Bangor	9/1/2011	9/1/2011	RW 70-UF-MF		NA	NA	FS
Veazie	Bangor	9/2/2011	9/2/2011	VZD-0902	x	NA	NA	FS
Veazie	Bangor	6/13/2012	6/13/2012	VZD-0613	x	NA	NA	FS
Veazie	Bangor	7/16/2012	7/16/2012	VZD-071612		NA	NA	FS
Veazie-02	Bangor	7/16/2012	7/16/2012	VZD2-071612		NA	NA	FS
Veazie	Bangor	7/16/2012	7/16/2012	VZD_VZD	x			
Veazie	Bangor	8/30/2012	8/30/2012	VZD-083012		NA	NA	FS
Veazie-02	Bangor	8/30/2012	8/30/2012	VZD2-083012		NA	NA	FS
Veazie	Bangor	8/30/2012	8/30/2012	VZD_VZD	x			
Veazie	Bangor	9/25/2012	9/25/2012	VZD-092512		NA	NA	FS
Veazie-02	Bangor	9/25/2012	9/25/2012	VZD2-092512		NA	NA	FS
Veazie	Bangor	9/25/2012	9/25/2012	VZD_VZD	x			
OV-02	Veazie	5/26/2016	5/26/2016	OV02_052	x	1	1	FS
OV-02	Veazie	6/29/2016	6/29/2016	OV-02_06	x	1	1	FS
OV-02	Veazie	7/18/2016	7/18/2016	OV-02_07	x	1	1	FS
OV-02	Veazie	8/29/2016	8/29/2016	OV-02_08	x	1	1	FS
OV-02	Veazie	9/27/2016	9/27/2016	OV-02_09	x	1	1	FS
OV-02	Veazie	10/26/2016	10/26/2016	OV-02_10	x	1	1	FS
WQ-ECH	Verona East	5/26/2016	5/26/2016	WQ-ECH_	x	1	1	FS
WQ-ECH	Verona East	6/29/2016	6/29/2016	WQ-ECH_	x	1	1	FS
WQ-ECH	Verona East	7/18/2016	7/18/2016	WQ-ECH_	x	1	1	FS
WQ-ECH	Verona East	8/29/2016	8/29/2016	WQ-ECH_	x	1	1	FS
WQ-ECH	Verona East	9/26/2016	9/26/2016	WQ-ECH_	x	1	1	FS
WQ-ECH	Verona East	10/26/2016	10/26/2016	WQ-ECH_	x	1	1	FS

WQ-FPT	Upper Penobsc	5/26/2016	5/26/2016	WQ-FPT_(	x	1	1	FS
WQ-FPT	Upper Penobsc	6/29/2016	6/29/2016	WQ-FPT_(	x	1	1	FS
WQ-FPT	Upper Penobsc	7/18/2016	7/18/2016	WQ-FPT_(	x	1	1	FS
WQ-FPT	Upper Penobsc	8/30/2016	8/30/2016	WQ_FPT_(	x	1	1	FS
WQ-FPT	Upper Penobsc	9/26/2016	9/26/2016	WQ-FPT_(	x	1	1	FS
WQ-FPT	Upper Penobsc	10/26/2016	10/26/2016	WQ-FPT_1	x	1	1	FS
WQ1b-C	Orrington	4/18/2009	4/18/2009	WQ1b-2-UF		18.7	18.7	FS
WQ1b-C	Orrington	4/18/2009	4/18/2009	WQ1b-bot-UF		34.9	34.9	FS
WQ1b-C	Orrington	4/18/2009	4/18/2009	WQ1b-SW-UF		2.8	2.8	FS
WQ1b-R	Orrington	4/18/2009	4/18/2009	WQ1b-R-2-UF		12.5	12.5	FS
WQ1b-R	Orrington	4/18/2009	4/18/2009	WQ1b-R-bot-UF		20.8	20.8	FS
WQ1b-R	Orrington	4/18/2009	4/18/2009	WQ1b-R-SW-UF		3.2	3.2	FS
WQ1b	Orrington	4/18/2009	4/18/2009	WQ1b-SW	x			
WQ1b-C	Orrington	7/8/2009	7/8/2009	WQ1bC-SW-UF		2.92	2.92	FS
WQ1b-R	Orrington	7/8/2009	7/8/2009	WQ1bL-SW-UF		2.99	2.99	FS
WQ1b-R	Orrington	7/8/2009	7/8/2009	WQ1bR-SW-UF		2.99	2.99	FS
WQ1b-R	Orrington	7/8/2009	7/8/2009	WQ1bR-SW-UF-ave				
WQ1b-C	Orrington	9/2/2009	9/2/2009	WQ1bC-2-UF		15	15	FS
WQ1b-C	Orrington	9/2/2009	9/2/2009	WQ1bC-bot-UF		26	26	FS
WQ1b	Orrington	7/8/2009	7/8/2009	WQ1bC-bF	x			
WQ1b-C	Orrington	9/2/2009	9/2/2009	WQ1bC-SW-UF		3	3	FS
WQ1b-R	Orrington	9/2/2009	9/2/2009	WQ1bR-2-UF		8	8	FS
WQ1b-R	Orrington	9/2/2009	9/2/2009	WQ1bR-bot-UF		14	14	FS
WQ1b-R	Orrington	9/2/2009	9/2/2009	WQ1bR-SW-UF		3	3	FS
WQ1b-R	Orrington	9/2/2009	9/2/2009	WQ1bR-SW-UF_ave				
WQ1b-C	Orrington	7/27/2010	7/27/2010	WQ1b-C -2-UF		18.3	18.3	FS
WQ1b-C	Orrington	7/27/2010	7/27/2010	WQ1b-C -bot-UF		31.9	31.9	FS
WQ1b	Orrington	9/2/2009	9/2/2009	WQ1bC-bF	x			
WQ1b-C	Orrington	7/27/2010	7/27/2010	WQ1b-C -SW-UF		3.3	3.3	FS
WQ1b-R	Orrington	7/27/2010	7/27/2010	WQ1bR -2-UF		12	12	FS
WQ1b-R	Orrington	7/27/2010	7/27/2010	WQ1bR -bot-UF		20.8	20.8	FS
WQ1b-R	Orrington	7/27/2010	7/27/2010	WQ1bR -SW-UF		3	3	FS
WQ1b-C	Orrington	7/16/2012	7/16/2012	WQ1b-C-071612		NA	NA	FS
WQ1b-C	Orrington	7/16/2012	7/16/2012	WQ1b-C2-071612		NA	NA	FS
WQ1b	Orrington	7/27/2010	7/27/2010	WQ1b-bR_	x			
WQ1b-C	Orrington	7/16/2012	7/16/2012	WQ1b-CnC	x			
WQ1b-C	Orrington	5/26/2016	5/26/2016	WQ1b-C_(	x	1	1	FS
WQ1b-C	Orrington	6/29/2016	6/29/2016	WQ1b-C_(	x	1	1	FS
WQ1b-C	Orrington	7/18/2016	7/18/2016	WQ1b-C_(	x	1	1	FS
WQ1b-C	Orrington	8/30/2016	8/30/2016	WQ1b-C_(	x	1	1	FS
WQ1b-C	Orrington	9/27/2016	9/27/2016	WQ1b-C_(	x	1	1	FS
WQ1b-C	Orrington	10/25/2016	10/25/2016	WQ1b-C_1	x	1	1	FS
WQ2-Winte	Winterport	8/19/2008	8/19/2008	WQ2-Winterport-2-UF		8.6	8.6	FS
WQ2-Winte	Winterport	8/19/2008	8/19/2008	WQ2-Winterport-3-UF		17	17	FS
WQ2-Winte	Winterport	8/19/2008	8/19/2008	WQ2-Winterport-bot-U		25	25	FS
WQ2-Winte	Winterport	8/19/2008	8/19/2008	WQ2-Winterport-SW-U		0.32	0.32	FS
WQ2-C	Winterport	4/16/2009	4/16/2009	WQ2-2-UF		8.7	8.7	FS
WQ2-C	Winterport	4/16/2009	4/16/2009	WQ2-3-UF		22.2	22.2	FS
WQ2-C	Winterport	4/16/2009	4/16/2009	WQ2-bot-UF		30	30	FS
WQ2-C	Winterport	4/16/2009	4/16/2009	WQ2-SW-UF		2.82	2.82	FS
WQ2-Winte	Winterport	8/19/2008	8/19/2008	WQ2-Winte	x			
WQ2-C	Winterport	4/16/2009	4/16/2009	WQ2-SW-UF				
WQ2-L	Winterport	4/16/2009	4/16/2009	WQ1a-L-3-UF		NA	NA	FS
WQ2-R	Winterport	4/16/2009	4/16/2009	WQ2-R-2-UF		8.21	8.21	FS
WQ2-R	Winterport	4/16/2009	4/16/2009	WQ2-R-3-UF		25.2	25.2	FS

WQ2-R	Winterport	4/16/2009	4/16/2009	WQ2-R-bot-UF	30.82	30.82	FS
WQ2-R	Winterport	4/16/2009	4/16/2009	WQ2-R-SW-UF	3.11	3.11	FS
WQ2-R	Winterport	4/16/2009	4/16/2009	WQ2-R-SW-UF_ave			
WQ2	Winterport	4/16/2009	4/16/2009	WQ2_WQ1 x			
WQ2-C	Winterport	7/7/2009	7/7/2009	WQ2C-SW-UF	2.6	2.6	FS
WQ2-L	Winterport	7/7/2009	7/7/2009	WQ2L-SW-UF	2.72	2.72	FS
WQ2-R	Winterport	7/7/2009	7/7/2009	WQ2R-SW-UF	2.71	2.71	FS
WQ2	Winterport	7/7/2009	7/7/2009	WQ2C_W(x			
WQ2-C	Winterport	9/1/2009	9/1/2009	WQ2C-2-UF	8	8	FS
WQ2-C	Winterport	9/1/2009	9/1/2009	WQ2C-3-UF	22	22	FS
WQ2-C	Winterport	9/1/2009	9/1/2009	WQ2C-bot-UF	28	28	FS
WQ2-C	Winterport	9/1/2009	9/1/2009	WQ2C-SW-UF	3	3	FS
WQ2-L	Winterport	9/1/2009	9/1/2009	WQ2L-2-UF	8	8	FS
WQ2-L	Winterport	9/1/2009	9/1/2009	WQ2L-3-UF	22	22	FS
WQ2-L	Winterport	9/1/2009	9/1/2009	WQ2L-bot-UF	30	30	FS
WQ2-L	Winterport	9/1/2009	9/1/2009	WQ2L-SW-UF	3	3	FS
WQ2-L	Winterport	9/1/2009	9/1/2009	WQ2L-SW-UF_ave			
WQ2-R	Winterport	9/1/2009	9/1/2009	WQ2R-2-UF	8	8	FS
WQ2-R	Winterport	9/1/2009	9/1/2009	WQ2R-3-UF	24	24	FS
WQ2-R	Winterport	9/1/2009	9/1/2009	WQ2R-bot-UF	31	31	FS
WQ2-R	Winterport	9/1/2009	9/1/2009	WQ2R-SW-F	3	3	FS
WQ2-R	Winterport	9/1/2009	9/1/2009	WQ2R-SW-F_ave			
WQ2-C	Winterport	7/26/2010	7/26/2010	WQ2C -2-UF	17	17	FS
WQ2-C	Winterport	7/26/2010	7/26/2010	WQ2C -bot-UF	30	30	FS
WQ2	Winterport	9/1/2009	9/1/2009	WQ2C_W(x			
WQ2-C	Winterport	7/26/2010	7/26/2010	WQ2C -SW-UF	3	3	FS
WQ2-L	Winterport	7/26/2010	7/26/2010	WQ2L -2-UF	17	17	FS
WQ2-L	Winterport	7/26/2010	7/26/2010	WQ2L -bot-UF	31	31	FS
WQ2-L	Winterport	7/26/2010	7/26/2010	WQ2L -SW-UF	3	3	FS
WQ2-R	Winterport	7/26/2010	7/26/2010	WQ2R -2-UF	18	18	FS
WQ2-R	Winterport	7/26/2010	7/26/2010	WQ2R -bot-UF	31	31	FS
WQ2-R	Winterport	7/26/2010	7/26/2010	WQ2R -SW-UF	4	4	FS
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-0.2F-070711	1	1	FS
WQ2	Winterport	7/26/2010	7/26/2010	WQ2C_W(x			
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-0.45F-070711	1	1	FS
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-1F-070711	1	1	FS
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-5F-070711	1	1	FS
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-63F-070711	1	1	FS
1WNT	Winterport	7/7/2011	7/7/2011	1WNT-UF-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-0.2F-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-0.45F-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-1F-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-5F-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-63F-070711	1	1	FS
2WNT	Winterport	7/7/2011	7/7/2011	2WNT-UF-070711	1	1	FS
WPT-02	Winterport	7/7/2011	7/7/2011	WPT002	4.6	4.6	FS
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-0.2F-08032011	1	1	FS
WNT	Winterport	7/7/2011	7/7/2011	1WNT_2W x			
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-0.45F-0803201	1	1	FS
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-0.45FG-08031	1	1	FS
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-1F-08032011	1	1	FS
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-63F-08032011	1	1	FS
1WNT	Winterport	8/3/2011	8/3/2011	1WNT-UF-08032011	1	1	FS
2WNT	Winterport	8/3/2011	8/3/2011	2WNT-0.2F-08032011	1	1	FS
2WNT	Winterport	8/3/2011	8/3/2011	2WNT-0.45F-0803201	1	1	FS

2WNT	Winterport	8/3/2011	8/3/2011	2WNT-1F-08032011		1	1	FS
2WNT	Winterport	8/3/2011	8/3/2011	2WNT-63F-08032011		1	1	FS
2WNT	Winterport	8/3/2011	8/3/2011	2WNT-UF-08032011		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-0.2F-08032011		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-0.45F-0803201		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-0.45FG-080311		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-1F-08032011		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-63F-08032011		1	1	FS
3WNT	Winterport	8/3/2011	8/3/2011	3WNT-UF-08032011		1	1	FS
4WNT	Winterport	8/3/2011	8/3/2011	4WNT-0.2F-08032011		1	1	FS
4WNT	Winterport	8/3/2011	8/3/2011	4WNT-0.45F-0803201		1	1	FS
4WNT	Winterport	8/3/2011	8/3/2011	4WNT-1F-08032011		1	1	FS
4WNT	Winterport	8/3/2011	8/3/2011	4WNT-63F-08032011		1	1	FS
4WNT	Winterport	8/3/2011	8/3/2011	4WNT-UF-08032011		1	1	FS
WNT-1+2	Winterport	8/3/2011	8/3/2011	WNT 1+ 2		NA	NA	FS
WNT-3+4	Winterport	8/3/2011	8/3/2011	WNT 3+ 4		NA	NA	FS
WNT	Winterport	8/3/2011	8/3/2011	WNT_ave_	x			
WPT	Winterport	6/13/2012	6/13/2012	WPT-0613	x	NA	NA	FS
WPT	Winterport	7/16/2012	7/16/2012	WPT-071612		NA	NA	FS
WPT-02	Winterport	7/16/2012	7/16/2012	WPT2-071612		NA	NA	FS
WPT	Winterport	7/16/2012	7/16/2012	WPT_ave_	x			
WPT	Winterport	8/30/2012	8/30/2012	WPT-083012		NA	NA	FS
WPT-02	Winterport	8/30/2012	8/30/2012	WPT2-083012		NA	NA	FS
WPT	Winterport	8/30/2012	8/30/2012	WPT_ave_	x			
WPT	Winterport	9/25/2012	9/25/2012	WPT-092512		NA	NA	FS
WPT-02	Winterport	9/25/2012	9/25/2012	WPT2-092512		NA	NA	FS
WPT	Winterport	9/25/2012	9/25/2012	WPT_ave_	x			
WQ2-C	Winterport	5/27/2016	5/27/2016	WQ2-C_05	x	1	1	FS
WQ2-C	Winterport	6/30/2016	6/30/2016	WQ2-C_06	x	1	1	FS
WQ2-C	Winterport	7/18/2016	7/18/2016	WQ2-C_07	x	1	1	FS
WQ2-C	Winterport	8/30/2016	8/30/2016	WQ2-C_08	x	1	1	FS
WQ2-C	Winterport	9/26/2016	9/26/2016	WQ2-C_09	x	1	1	FS
WQ2-C	Winterport	10/26/2016	10/26/2016	WQ2-C_10	x	1	1	FS
WQ3-C	Bucksport	4/19/2009	4/19/2009	WQ3-2-UF		14.7	14.7	FS
WQ3-C	Bucksport	4/19/2009	4/19/2009	WQ3-3-UF		25.6	25.6	FS
WQ3-C	Bucksport	4/19/2009	4/19/2009	WQ3-bot-UF		27.2	27.2	FS
WQ3-L	Bucksport	4/19/2009	4/19/2009	WQ3L-2-UF		12.7	12.7	FS
WQ3-L	Bucksport	4/19/2009	4/19/2009	WQ3L-3-UF		24.3	24.3	FS
WQ3-L	Bucksport	4/19/2009	4/19/2009	WQ3L-bot-UF		28.1	28.1	FS
WQ3-L	Bucksport	4/19/2009	4/19/2009	WQ3L-SW-UF		2.9	2.9	FS
WQ3-R	Bucksport	4/19/2009	4/19/2009	WQ3-SW-UF		3.2	3.2	FS
WQ3-R	Bucksport	4/19/2009	4/19/2009	WQ3R-2-UF		10.4	10.4	FS
WQ3-R	Bucksport	4/19/2009	4/19/2009	WQ3R-3-UF		20.3	20.3	FS
WQ3-R	Bucksport	4/19/2009	4/19/2009	WQ3R-bot-UF		24.6	24.6	FS
WQ3-R	Bucksport	4/19/2009	4/19/2009	WQ3R-SW-UF		2.6	2.6	FS
WQ3	Bucksport	4/19/2009	4/19/2009	WQ3L_WQ	x			
WQ3-C	Bucksport	7/8/2009	7/8/2009	WQ3C-SW-UF		2.91	2.91	FS
WQ3-L	Bucksport	7/8/2009	7/8/2009	WQ3L-SW-UF		2.97	2.97	FS
WQ3-R	Bucksport	7/8/2009	7/8/2009	WQ3R-SW-UF		2.94	2.94	FS
WQ3-C	Bucksport	9/3/2009	9/3/2009	WQ3C-2-UF		14	14	FS
WQ3-C	Bucksport	9/3/2009	9/3/2009	WQ3C-bot-UF		25	25	FS
WQ3	Bucksport	7/8/2009	7/8/2009	WQ3L_WQ	x			
WQ3-C	Bucksport	9/3/2009	9/3/2009	WQ3C-SW-UF		2.91	2.91	FS
WQ3-L	Bucksport	9/3/2009	9/3/2009	WQ3L-2-UF		19	19	FS
WQ3-L	Bucksport	9/3/2009	9/3/2009	WQ3L-bot-UF		35	35	FS

WQ3-L	Bucksport	9/3/2009	9/3/2009	WQ3L-SW-UF		3	3	FS
WQ3-L	Bucksport	9/3/2009	9/3/2009	WQ3LSurface-UF		3	3	FS
WQ3-L	Bucksport	9/3/2009	9/3/2009	WQ3LSurface-UF_ave				
WQ3-R	Bucksport	9/3/2009	9/3/2009	WQ3R-2-UF		15	15	FS
WQ3-R	Bucksport	9/3/2009	9/3/2009	WQ3R-bot-UF		26	26	FS
WQ3-R	Bucksport	9/3/2009	9/3/2009	WQ3R-SW-UF		3	3	FS
WQ3-C	Bucksport	7/28/2010	7/28/2010	WQ3-C -2-UF		15.2	15.2	FS
WQ3-C	Bucksport	7/28/2010	7/28/2010	WQ3-C -bot-UF		26	26	FS
WQ3	Bucksport	9/3/2009	9/3/2009	WQ3L_WQ	x			
WQ3-C	Bucksport	7/28/2010	7/28/2010	WQ3-C -SW-UF		3.1	3.1	FS
WQ3-L	Bucksport	7/28/2010	7/28/2010	WQ3-L -2-UF		16.8	16.8	FS
WQ3-L	Bucksport	7/28/2010	7/28/2010	WQ3-L -bot-UF		31	31	FS
WQ3-L	Bucksport	7/28/2010	7/28/2010	WQ3-L -SW-UF		3.4	3.4	FS
WQ3-R	Bucksport	7/28/2010	7/28/2010	WQ3-R -2-UF		15.5	15.5	FS
WQ3-R	Bucksport	7/28/2010	7/28/2010	WQ3-R -bot-UF		27.6	27.63	FS
WQ3-R	Bucksport	7/28/2010	7/28/2010	WQ3-R -SW-UF		3	3	FS
WQ3-C	Bucksport	7/16/2012	7/16/2012	WQ3-C-071612	NA	NA		FS
WQ3-C	Bucksport	7/16/2012	7/16/2012	WQ3-C2-071612	NA	NA		FS
WQ3	Bucksport	7/28/2010	7/28/2010	WQ3L_WQ	x			
WQ3-C	Bucksport	7/16/2012	7/16/2012	WQ3-CnC2	x			
WQ3-L	Bucksport	5/26/2016	5/26/2016	WQ3-L_05	x	1	1	FS
WQ3-L	Bucksport	6/29/2016	6/29/2016	WQ3-L_06	x	1	1	FS
WQ3-L	Bucksport	7/18/2016	7/18/2016	WQ3-L_07	x	1	1	FS
WQ3-L	Bucksport	8/30/2016	8/30/2016	WQ3-L_08	x	1	1	FS
WQ3-L	Bucksport	9/26/2016	9/26/2016	WQ3-L_09	x	1	1	FS
WQ3-L	Bucksport	10/26/2016	10/26/2016	WQ3-L_10	x	1	1	FS

X	Y	Dissolved.I	Dissolved.I	Total.Merc	Total.Merc	Dissolved.I	Dissolved.I	Total.Meth	Total.Meth
906484	313050	NA		NA		NA		NA	
906484	313050	NA		NA		NA		0.013	
906484	313050	1.02		1.95		NA		NA	
		1.02		1.95				0.013	
906484	313050	1.0643		2.53918		0.0349		0.07808	
906484	313050	0.7675		4.19225		0.03765		0.10458	
906484	313050	1.395		8.51		0.05205		0.1755	
906484	313050	1.33		5.805		0.08615		0.1905	
906484	313050	0.72283		36.1033		0.0094	U	1.02847	
906484	313050	0.37	U	6.13		0.025	U	0.025	U
906484	313050	0.295	U	0.935	U	0.025	U	0.025	U
906484	313050	0.315	U	1.72		0.047	J	0.043	J
906484	313050	1.35	U	21		0.055		0.345	
906484	313050	2.29		7.59		0.025	U	0.209	J
906484	313050	0.86		2.35		0.025	U	0.025	U
931983.4	426857.5	NA		NA		NA		NA	
931983.4	426857.5	2.26		2.94		0.2835		0.3385	
		2.26		2.94		0.2835		0.3385	
931983.4	426857.5	2.55015		2.67299		0.1089		0.13169	
931983.4	426857.5	1.735		2.12		0.0899		0.113	
931983.4	426857.5	3.58		5.705		0.1325		0.1525	
931983.4	426857.5	2.55571		3.2869		0.14706		0.20108	
931983.4	426857.5	1.72563		2.1562		0.09876		0.15817	
931721	425801	1.82		2.52		NA		NA	
931849	424853	1.83		2.23		NA		NA	
		1.825		2.375					
931721	425801	2.8		4.13		NA		NA	
931849	424853	3.82		5.96		NA		NA	
931849	424853	4.79		6.24		NA		NA	
931849	424853	4.76		5.6		NA		NA	
931849	424853	3.95		5.05		NA		NA	
931849	424853	3.88		4.46		NA		NA	
931849	424853	3.48		3.99		NA		NA	
931849	424853	3.16		3.79		NA		NA	
931849	424853	3.02		3.62		NA		NA	
931849	424853	2.53		3.47		NA		NA	
931849	424853	3.58		4.38		NA		NA	
931849	424853	2.64		3.08		NA		NA	
931849	424853	2.26		3.02		NA		NA	
931797	424999	2.32		NA		0.187		NA	
931797	424999	2.24		NA		0.211		NA	
931797	424999	2.35		NA		0.188		NA	
931797	424999	2.43		NA		0.199		NA	
931797	424999	2.65		NA		0.206		NA	
931797	424999	NA		2.59		NA		0.184	
931797	424999	2.35		NA		0.209		NA	
931797	424999	2.42		NA		0.203		NA	
931797	424999	2.37		NA		0.19		NA	
931797	424999	2.49		NA		0.232		NA	
931797	424999	2.76		NA		0.216		NA	
931797	424999	NA		2.81		NA		0.242	
931849	424853	NA		NA		NA		NA	
931797	424999	1.89		NA		0.192		NA	
		2.33		2.7		0.207		0.213	

931797	424999	1.84		NA		0.164		NA	
931797	424999	1.86		NA		0.222		NA	
931797	424999	1.89		NA		0.179		NA	
931797	424999	2.18		NA		0.208		NA	
931797	424999	NA		2.32		NA		0.182	
931797	424999	2.11		NA		0.119		NA	
931797	424999	1.81		NA		0.169		NA	
931797	424999	2.1		NA		0.185		NA	
931797	424999	1.73		NA		0.206		NA	
931797	424999	NA		2.68		NA		0.219	
		1.836667		2.5		0.185		0.2005	
931849	424853	2.44		2.96		NA		NA	
931849	424853	2.38		3.34		NA		NA	
931849	424853	2.63		6.01		NA		NA	
931797	424999	0.446		NA		0.0881		NA	
931797	424999	NA		0.555		NA		0.0829	
931797	424999	0.533		NA		0.0482		NA	
931797	424999	NA		1.1		NA		0.0295	
931797	424999	3.08		NA		0.225		NA	
931797	424999	NA		3.17		NA		0.243	
931797	424999	3.34		NA		0.198		NA	
931797	424999	NA		6.06		NA		0.268	
931797	424999	1.62		NA		0.155		NA	
931797	424999	NA		1.84		NA		0.132	
931797	424999	1.63		NA		0.102		NA	
931797	424999	NA		3.69		NA		0.165	
931797	424999	1.94		NA		0.147		NA	
931797	424999	NA		2.27		NA		0.198	
931797	424999	1.89		NA		0.137		NA	
931797	424999	NA		4.61		NA		0.221	
931797	424999	NA		NA		NA		NA	
931797	424999	NA		NA		NA		NA	
931849	424853	4.04		4.94		NA		NA	
931849	424853	2.77		3.14		0.216		0.223	
931849	424853	2.24		2.6		0.252		0.306	
931849	424853	2.19		2.55		0.254		0.308	
		2.215		2.575		0.253		0.307	
931849	424853	1.62		1.84		0.152		0.198	
931849	424853	1.53		1.83		0.15		0.169	
		1.575		1.835		0.151		0.1835	
931849	424853	1.37		1.74		0.112		0.133	
931849	424853	1.39		1.72		0.128		0.147	
		1.38		1.73		0.12		0.14	
931983.4	426857.5	1.63		2.18		0.078		0.113	
931983.4	426857.5	0.595	U	0.91	U	0.0635	U	0.0845	U
931983.4	426857.5	1.26		1.68		0.107		0.141	
931983.4	426857.5	0.635	U	1.08	U	0.127		0.205	
931983.4	426857.5	0.33	U	0.25	U	0.103	J	0.106	J
931983.4	426857.5	0.31	U	0.96		0.066	J	0.078	J
917753	313923	0.37	U	6.9		0.025	U	0.025	U
917753	313923	0.53	U	2.3		0.025	U	0.0355	U
917753	313923	0.29	U	2.55		0.025	U	0.067	
917753	313923	0.47	U	9.14		0.025	U	0.155	
917753	313923	0.67	U	2.62		0.025	U	0.036	J
917753	313923	2.17		8.49		0.025	U	0.136	J

904790	292387	0.25	U	1.67		0.025	U	0.025	U
904790	292387	0.34	U	0.835	U	0.025	U	0.025	U
904790	292387	0.5		1.44		0.025	U	0.035	J
904790	292387	0.25	U	1.87		0.025	U	0.04	J
904790	292387	0.25	U	1.63		0.025	U	0.025	U
904790	292387	1.25		1.64		0.025	U	0.025	U
896861	382753	2.51		3.4		0.0793		0.141	
896861	382753	2.57		3.38		0.0907		0.153	
896861	382753	2.52		3.44		0.106		0.116	
896706	382899	2.57		3.64		0.053	B	0.123	
896706	382899	2.52		3.45		0.109		0.118	
896706	382899	2.56		3.25		0.101		0.151	
		2.54		3.345		0.1035		0.1335	
896861	382753	3.26		4.17		0.235		0.363	
896706	382899	3.04		3.97		0.213		0.343	
896706	382899	3.25		4.16		0.165		0.365	
		3.145		4.065		0.189		0.354	
896861	382753	1.51		6.59		0.174		0.279	
896861	382753	1.38		7.29		0.13		0.268	
		3.2025		4.1175		0.212		0.3585	
896861	382753	1.72		3.29		0.139		0.162	V
896706	382899	1.5		4.52		0.133		0.173	
896706	382899	1.49		9.79		0.148		0.239	
896706	382899	1.7		4.35		0.146		0.23	
		1.6		4.435		0.1395		0.2015	
896861	382753	2.08		7.01		0.0469		0.166	
896861	382753	1.4		16.8		0.0358		0.329	
		1.66		3.8625		0.13925		0.18175	
896861	382753	1.34		2.63		0.0585		0.14	
896706	382899	1.24		4.61		0.0696		0.13	
896706	382899	1.33		9.32		0.0485		0.216	
896706	382899	1.35		5.23		0.0839		0.117	
896861	382753	1.99		2.76		0.256		0.261	
896861	382753	1.99		2.82		0.231		0.263	
		1.345		3.93		0.0712		0.1285	
		1.99		2.79		0.2435		0.262	
896861	382753	1.35		9.85		0.031	J	0.214	
896861	382753	0.935	U	37.2		0.033	U	0.617	
896861	382753	0.58	U	5.86		0.116		0.259	
896861	382753	1.23		7.83		0.129		0.336	
896861	382753	0.39	U	1.99		0.051	J	0.162	J
896861	382753	4.35		4.95		0.106	J	0.12	J
895144	351554	1.99		5.24		0.123		0.206	
895144	351554	1.55		7.24		0.0723		0.193	
895144	351554	1.15		8.08		0.0523		0.178	
895144	351554	1.96		4.56		0.153		0.204	
895277	352064	2.4		4.18		0.098		0.13	
895277	352064	0.8		4.61		0.0389	B	0.117	
895277	352064	0.528		9.59		0.0337	B	0.154	
895277	352064	2.4		3.77		0.107		0.122	
		1.975		4.9		0.138		0.205	
		2.4		3.975		0.1025		0.126	
895614	351771	1.4		6.02		0.0592	B	0.151	
894939	352248	2.25		7.09		0.0695		0.145	
894939	352248	1.79		25.4		0.0445		0.501	

894939	352248	0.746	14.5	0.0222		0.282
894939	352248	2.32	5.32	0.0786		0.128
		2.285	6.205	0.07405		0.1365
		2.028333	5.4	0.078583		0.137833
895277	352064	2.95	4.56	0.281		0.34
895614	351771	2.83	4.84	0.238		0.328
894939	352248	3.12	4.84	0.257		0.318
		2.966667	4.746667	0.258667		0.328667
895277	352064	1.21	3.09	0.0443		0.0813
895277	352064	0.874	4.8	0.0358		0.0921
895277	352064	0.745	5.05	0.01035	U	0.104
895277	352064	1.31	2.53	0.0812		0.119
895614	351771	1.13	4.05	0.0457		0.089
895614	351771	0.91	5.28	0.0257		0.103
895614	351771	0.808	6.84	0.01035	U	0.124
895614	351771	1.28	2.59	0.0757		0.0923
		1.205	3.32	0.0607		0.09065
894939	352248	1.17	3.36	0.0407		0.113
894939	352248	0.969	24.4	0.0443		0.6
894939	352248	0.689	25.9	0.01035	U	0.496
894939	352248	2.41	1.29	0.115		0.0845
		1.79	2.325	0.07785		0.09875
895277	352064	0.928	4.5	0.0438		0.128
895277	352064	0.91	5.96	0.0408		0.138
		1.37875	2.81625	0.066013		0.097425
895277	352064	1.22	3.96	0.0582		0.116
895614	351771	0.985	7.99	0.0392		0.206
895614	351771	0.857	8.17	0.0393		0.153
895614	351771	1.35	4.09	0.0585		0.105
894939	352248	1.15	15.2	0.0516		0.381
894939	352248	0.697	8.66	0.0431		0.195
894939	352248	1.26	8.45	0.0696		0.215
895570	353703	1.51	NA	0.0861		NA
		1.276667	5.5	0.0621		0.145333
895570	353703	1.54	NA	0.0868		NA
895570	353703	1.75	NA	0.0725		NA
895570	353703	1.87	NA	0.103		NA
895570	353703	13.7	NA	0.251		NA
895570	353703	NA	56.5	NA		1.16
895570	353703	1.43	NA	0.0952		NA
895570	353703	1.48	NA	0.0837		NA
895570	353703	1.52	NA	0.0846		NA
895570	353703	2.84	NA	0.0956		NA
895570	353703	12.7	NA	0.276		NA
895570	353703	NA	52.7	NA		1.12
895491	353521	2.06	NA	NA		NA
895570	353703	1.69	NA	0.0573		NA
		1.693333	54.6	0.08525		1.14
895570	353703	2.75	NA	0.0966		NA
895570	353703	2.64	NA	0.0647		NA
895570	353703	1.95	NA	0.0754		NA
895570	353703	9.45	NA	0.211		NA
895570	353703	NA	9.04	NA		0.211
895570	353703	1.96	NA	0.0579		NA
895570	353703	1.69	NA	0.0657		NA

895570	353703	1.72		NA	0.104		NA	
895570	353703	9.32		NA	0.213		NA	
895570	353703	NA		8.98	NA		0.167	
895570	353703	1.69		NA	0.0588		NA	
895570	353703	1.62		NA	0.0418		NA	
895570	353703	1.48		NA	0.0876		NA	
895570	353703	1.77		NA	0.0471		NA	
895570	353703	19.9		NA	0.299		NA	
895570	353703	NA		33.2	NA		0.705	
895570	353703	1.77		NA	0.0585		NA	
895570	353703	1.49		NA	0.0414		NA	
895570	353703	1.59		NA	0.0552		NA	
895570	353703	16.9		NA	0.268		NA	
895570	353703	NA		23.2	NA		0.422	
895570	353703	NA		NA	NA		NA	
895570	353703	NA		NA	NA		NA	
		1.945		18.605	0.0663		0.37625	
895491	353521	2.1		17.2	0.175		0.446	
895491	353521	1.79		6.99	0.188		0.323	
895491	353521	1.84		5.94	0.145		0.29	
		1.815		6.465	0.1665		0.3065	
895491	353521	1.34		4.88	0.0563		0.159	
895491	353521	1.34		10.2	0.0648		0.255	
		1.34		7.54	0.06055		0.207	
895491	353521	1.26		3.84	0.052		0.0954	
895491	353521	1.32		3.14	0.0588		0.0873	
		1.29		3.49	0.0554		0.09135	
895277	352064	1.42		34.9	0.025	U	0.423	
895277	352064	0.69	U	3.31	0.025	U	0.03	U
895277	352064	8.71		16.1	0.142		0.36	
895277	352064	0.55	U	3.72	0.058		0.118	
895277	352064	0.395	U	3.63	0.025	U	0.062	J
895277	352064	1.89		5.27	0.034	J	0.124	J
902102	333262	1.85		3.16	0.0688		0.0926	
902102	333262	1.45		2.92	0.0584		0.0845	
902102	333262	0.408		19.3	0.0216		0.484	
902623	333078	1.64		5.75	0.0784		0.149	
902623	333078	1.24		6.12	0.0497		0.124	
902623	333078	1.15		7.71	0.0472		0.142	
902623	333078	1.83		8.045	0.08695		0.1665	
901373	333228	1.995		7.365	0.07145		0.1875	
901373	333228	1.82		5.79	0.0605		0.143	
901373	333228	1.77		12.9	0.0723		0.328	
901373	333228	1.63		14.9	0.0574		0.364	
901373	333228	1.81		6.725	0.0532		0.1615	
		1.878333		7.378333	0.070533		0.171833	
902102	333262	2.15		4.08	0.173		0.279	
902623	333078	2.555		4.065	0.2155		0.2815	
901373	333228	2.53		4.06	0.2315		0.2675	
902102	333262	0.749		2.51	0.0255		0.0607	
902102	333262	0.559		12.4	0.01035	U	0.284	
		2.411667		4.068333	0.206667		0.276	
902102	333262	1.01		2.48	0.0477		0.0824	
902623	333078	0.629		3.12	0.01035	U	0.059	
902623	333078	0.54		24.3	0.0214		0.809	

902623	333078	0.86		2.24		0.01035	U	0.0812	
902623	333078	0.958		2.17		0.0218		0.0748	
		0.909		2.205		0.016075		0.078	
901373	333228	1.13		4.3		0.0718		0.103	
901373	333228	0.755		8.4		0.0383		0.207	
901373	333228	1.175		5.215	v	0.0479		0.09975	
902102	333262	0.653		2.54		0.0331		0.0502	
902102	333262	0.815		9.12		0.0415		0.158	
		1.031333		3.3		0.037225		0.086717	
902102	333262	0.697		2.49		0.0217		0.0488	
902623	333078	0.563		3.25		0.032		0.0728	
902623	333078	0.583		21.7		0.0278		1.37	
902623	333078	0.696		2.875		0.0269		0.07075	
901373	333228	0.625		3.03		0.0284		0.126	
901373	333228	0.894		10.6		0.0369		0.209	
901373	333228	0.976		2.93		0.0344		0.09445	
902102	333262	1.68		7.3		0.137		0.37	
902102	333262	2.27		5.23		0.16		0.203	
		0.789667		2.765		0.027667		0.071333	
		1.975		6.265		0.1485		0.2865	
902623	333078	0.365	U	3.04		0.025	U	0.029	J
902623	333078	0.485	U	2.5		0.025	U	0.029	U
902623	333078	0.6	U	8.05		0.025	U	0.132	
902623	333078	0.295	U	6		0.025	U	0.106	
902623	333078	0.565	U	2.91		0.025	U	0.036	J
902623	333078	0.95		5.42		0.025	U	0.113	J

Total.Susp	Total.Susp	locs
1.78		ES-15
NA		ES-15
NA		ES-15
1.78		ES-15
NA		ES-15
NA		ES-15
11.4		ES-15
8.16		ES-15
54.9		ES-15
12		ES-15
11		ES-15
8.7		ES-15
52		ES-15
16		ES-15
8.2		ES-15
2.02		Veazie
NA		Veazie
2.02		Veazie
NA		Veazie
NA		Veazie
10.145		Veazie
1.635		Veazie
2.07		Veazie
1.08		Veazie
0.25	U	Veazie
0.665		Veazie
4.67		Veazie
15.1		Veazie
22		Veazie
11.5		Veazie
5.67		Veazie
3.06		Veazie
2.45		Veazie
1.87		Veazie
1.91		Veazie
3.18		Veazie
2.87		Veazie
1.28		Veazie
1.27		Veazie
1.92		Veazie
0.78		Veazie
0.7		Veazie
0.38		Veazie
0.0082		Veazie
2.32		Veazie
2.36		Veazie
1.54		Veazie
1.3		Veazie
0.78		Veazie
0.0082		Veazie
0.77		Veazie
1		Veazie
-1.5		Veazie
1.282		Veazie

0		Veazie
NA		Veazie
-0.61		Veazie
0.047		Veazie
0.37		Veazie
0.79		Veazie
1.93		Veazie
0.92		Veazie
0.04		Veazie
-1.14		Veazie
0.766667		Veazie
1.41		Veazie
4.75		Veazie
17.7		Veazie
NA		Veazie
0.6		Veazie
NA		Veazie
4.1		Veazie
NA		Veazie
0.8		Veazie
NA		Veazie
20.2		Veazie
NA		Veazie
1.2		Veazie
NA		Veazie
11.5		Veazie
NA		Veazie
2.1		Veazie
NA		Veazie
13.9		Veazie
1.63		Veazie
2.15		Veazie
9.22		Veazie
2		Veazie
1.07		Veazie
1.22		Veazie
1.145		Veazie
0.583		Veazie
0.586		Veazie
0.5845		Veazie
0.581		Veazie
0.58		Veazie
0.5805		Veazie
2.5	U	Veazie
2.5	U	Veazie
2.5	U	Veazie
2.5	U	Veazie
2.5	U	Veazie
2.5	U	Veazie
7.3		WQ-ECH
11		WQ-ECH
9.2		WQ-ECH
25		WQ-ECH
9.2		WQ-ECH
12		WQ-ECH

8.3		WQ-FPT
6.5		WQ-FPT
7.2		WQ-FPT
11		WQ-FPT
13		WQ-FPT
8.6		WQ-FPT
1.77		WQ1b
1.82		WQ1b
1.72		WQ1b
1.56		WQ1b
1.64		WQ1b
1.73		WQ1b
1.725		WQ1b
2.38		WQ1b
3.07		WQ1b
2.92		WQ1b
2.995		WQ1b
9.25		WQ1b
4.93		WQ1b
2.6875		WQ1b
2		WQ1b
3.52		WQ1b
10.5		WQ1b
2.99		WQ1b
3.255		WQ1b
9.8		WQ1b
20.6		WQ1b
2.6275		WQ1b
4.535		WQ1b
6.14		WQ1b
14.2		WQ1b
4.65		WQ1b
1.26		WQ1b
2.09		WQ1b
4.5925		WQ1b
1.675		WQ1b
6.5		WQ1b
50		WQ1b
10		WQ1b
NA		WQ1b
2.5	U	WQ1b
7.2		WQ1b
4.67		WQ2
7.88		WQ2
9.43		WQ2
3.34		WQ2
1.62		WQ2
5.38		WQ2
12.9		WQ2
1.95		WQ2
4.005		WQ2
1.785		WQ2
7.62		WQ2
5.67		WQ2
25.5		WQ2

15.5	WQ2
3.65	WQ2
4.66	WQ2
4.688333	WQ2
2.53	WQ2
2.39	WQ2
2.07	WQ2
2.33	WQ2
4.29	WQ2
7.5	WQ2
12.7	WQ2
2.34	WQ2
4.85	WQ2
10.1	WQ2
10.3	WQ2
2.42	WQ2
3.635	WQ2
5.84	WQ2
23.6	WQ2
24.1	WQ2
2.66	WQ2
4.25	WQ2
8.19	WQ2
9.02	WQ2
3.62875	WQ2
8.59	WQ2
9.91	WQ2
13	WQ2
4.95	WQ2
25.8	WQ2
11.8	WQ2
23.9	WQ2
31.85	WQ2
12.48	WQ2
29.53	WQ2
27.93	WQ2
21.68	WQ2
1.46	WQ2
67.19	WQ2
67.16	WQ2
75.29	WQ2
92.31	WQ2
77.6	WQ2
7.14	WQ2
43.77	WQ2
NA	WQ2
35.1	WQ2
53.945	WQ2
34.1	WQ2
NA	WQ2
32.4	WQ2
0.14	WQ2
31.9	WQ2
29	WQ2
32.8	WQ2

29	WQ2
0.033	WQ2
28.9	WQ2
14.9	WQ2
12.6	WQ2
NA	WQ2
13.9	WQ2
4.25	WQ2
14.2	WQ2
14	WQ2
14.6	WQ2
13.5	WQ2
2.61	WQ2
14.8	WQ2
NA	WQ2
NA	WQ2
22.9875	WQ2
15.9	WQ2
7.53	WQ2
7.09	WQ2
7.31	WQ2
8.59	WQ2
14.6	WQ2
11.595	WQ2
4.13	WQ2
4.24	WQ2
4.185	WQ2
45	WQ2
6.8	WQ2
18	WQ2
6.8	WQ2
7.9	WQ2
10	WQ2
2.12	WQ3
3.7	WQ3
37.6	WQ3
3.74	WQ3
7.12	WQ3
10.3	WQ3
7.965	WQ3
8.7	WQ3
4.71	WQ3
11.5	WQ3
15.9	WQ3
6.635	WQ3
7.766667	WQ3
3.22	WQ3
3.135	WQ3
2.98	WQ3
7.22	WQ3
17.4	WQ3
3.111667	WQ3
5.59	WQ3
8.14	WQ3
45.9	WQ3

6.54	WQ3
5.87	WQ3
6.205	WQ3
7.8	WQ3
13.6	WQ3
5.71	WQ3
6.4	WQ3
17.6	WQ3
5.835	WQ3
5.51	WQ3
14.2	WQ3
14.3	WQ3
4.355	WQ3
5.89	WQ3
15.3	WQ3
5.93	WQ3
10.1	WQ3
8.23	WQ3
5.265	WQ3
9.165	WQ3
7.6	WQ3
24	WQ3
14	WQ3
10	WQ3
8.6	WQ3
12	WQ3

APPENDIX E-4
PROGRAM CODE FOR SURFACE WATER STATISTICAL ANALYSES

```
### File created for analysis of SW data for SW Report (2016)
### Resolved data quantity and longevity of data set to 7 main locations corresponding with 2016 sampling locations.
See code to
see designations.
### Code prepared by LSV 1/13/2017
### Code checked by NTG 2/14/2017
### HG v TSS Ancova code added by KPA 7/13/2017
### Code checked by TG 7/13/2017
library(lattice) #for xyplot()
library(PMCMR) #for post-hoc Nemenyi test
penob.sw = read.csv("SW_XTAB_ALL.csv")
summary(penob.sw)
penob.sw$locs = "DNU"
penob.sw$locs[penob.sw$Location == "1VZD" | penob.sw$Location == "2VZD" | penob.sw$Location == "Veazie" |
penob.sw$Location ==
"Veazie-02" | penob.sw$Location == "OV-02" | penob.sw$Location == "PRVZ" | penob.sw$Location == "RW" | penob.sw
$Location == "IRW"]
= "Veazie"
penob.sw$locs[penob.sw$Location == "WQ1b-R" | penob.sw$Location == "WQ1b-C"] = "WQ1b"
penob.sw$locs[penob.sw$Location == "WQ2-Winterport" | penob.sw$Location == "WQ2-C" | penob.sw$Location ==
"WQ2-L" | penob.sw
$Location == "WQ2-R" | penob.sw$Location == "1WNT" | penob.sw$Location == "2WNT" | penob.sw$Location ==
"3WNT" | penob.sw$Location
== "4WNT" | penob.sw$Location == "WNT-1+2" | penob.sw$Location == "WNT-3+4" | penob.sw$Location == "WPT-02" |
penob.sw$Location ==
"WPT"] = "WQ2"
penob.sw$locs[penob.sw$Location == "WQ3-R" | penob.sw$Location == "WQ3-C" | penob.sw$Location == "WQ3-L"] =
"WQ3"
penob.sw$locs[penob.sw$Location == "WQ-ECH"] = "WQ-ECH"
penob.sw$locs[penob.sw$Location == "WQ-FPT"] = "WQ-FPT"
penob.sw$locs[penob.sw$Location == "ES-15"] = "ES-15"
temp.sw = penob.sw[penob.sw$QC.Code == "FS" &! penob.sw$locs == "DNU",]
write.csv(temp.sw, "p.sw.csv") #export data set to do averages of samples in excel
p.sw = read.csv("p.sw_modified.csv") #file brought back in once averages on samples done where depths are provided
p.sw = p.sw[p.sw$use == "x",] #samples with only one depth (<10 ft) or average of a set of samples was marked in excel
with an x in
the "use" column
summary(p.sw)
p.sw$locs = factor(p.sw$locs)
p.sw$locs.facd = factor(p.sw$locs, levels(p.sw$locs)[c(1,3,4,5,6,7,2)])
p.sw$Date = as.Date(p.sw$Sample.Date, format = "%m/%d/%y")
p.sw$year = as.numeric(substring(p.sw$Date, 1, 4))
p.sw$month = as.numeric(substring(p.sw$Date, 6, 7))
p.sw$day = as.numeric(substring(p.sw$Date, 9, 10))
p.sw$season = "winter"
p.sw$season[p.sw$month > 3 & p.sw$month <= 6] = "spring"
p.sw$season[p.sw$month > 6 & p.sw$month <= 9] = "summer"
p.sw$season[p.sw$month > 9 & p.sw$month <= 12] = "fall"
p.sw$season = factor(p.sw$season)
p.sw$season = factor(p.sw$season, levels(p.sw$season)[c(4,2,3,1)])
summary(p.sw)
################
### ANALYSES ###
################
#T.Hg
anova(lm(Total.Mercury.Ppm.Result ~ year * locs * season, data = p.sw)) #test for significance of year, locs, season
posthoc.kruskal.nemenyi.test(p.sw$Total.Mercury.Ppm.Result ~ p.sw$locs, dist = "Chisq")
#post-hoc comparison for non-parametric data
#D.Hg
anova(lm(Dissolved.Mercury.Ppm.Result ~ year * locs * season, data = p.sw))
#test for significance of year, locs, season
posthoc.kruskal.nemenyi.test(p.sw$Dissolved.Mercury.Ppm.Result ~ p.sw$locs, dist = "Chisq")
#post-hoc comparison for non-parametric data
posthoc.kruskal.nemenyi.test(p.sw$Dissolved.Mercury.Ppm.Result ~ p.sw$season, dist = "Chisq")
#post-hoc comparison for nonparametric data
summary(lm(Dissolved.Mercury.Ppm.Result ~ year, data = p.sw))
#T.MeHg
anova(lm(Total.Methyl.mercury.Ppm.Result ~ year * locs * season, data = p.sw)) #test for significance of year, locs,
season
```

```
#anova(lm(Total.Methyl.mercury.Ppm.Result ~ year + locs + season, data = p.sw))
#secondary test to test for significance of year, locs, season without interaxn
summary(lm(Total.Methyl.mercury.Ppm.Result ~ year, data = p.sw))
#D.MeHg
anova(lm(Dissolved.Methyl.mercury.Ppm.Result ~ year * locs * season, data = p.sw))
#test for significance of year, locs, season
posthoc.kruskal.nemenyi.test(p.sw$Dissolved.Methyl.mercury.Ppm.Result ~ p.sw$locs, dist = "Chisq")
#post-hoc comparison for nonparametric data
summary(lm(Dissolved.Methyl.mercury.Ppm.Result ~ year, data = p.sw))
# Summary Table
sw.med.sum = data.frame(T.Hg.md = tapply(p.sw$Total.Mercury.Ppm.Result, factor(p.sw$locs), median, na.rm = TRUE))
sw.med.sum$T.Hg.x = tapply(p.sw$Total.Mercury.Ppm.Result, factor(p.sw$locs), mean, na.rm = TRUE)
sw.med.sum$D.Hg.md = tapply(p.sw$Dissolved.Mercury.Ppm.Result, factor(p.sw$locs), median, na.rm = TRUE)
sw.med.sum$D.Hg.x = tapply(p.sw$Dissolved.Mercury.Ppm.Result, factor(p.sw$locs), mean, na.rm = TRUE)
sw.med.sum$T.MeHg.md = tapply(p.sw$Total.Methyl.mercury.Ppm.Result, factor(p.sw$locs), median, na.rm = TRUE)
sw.med.sum$T.MeHg.x = tapply(p.sw$Total.Methyl.mercury.Ppm.Result, factor(p.sw$locs), mean, na.rm = TRUE)
sw.med.sum$D.MeHg.md = tapply(p.sw$Dissolved.Methyl.mercury.Ppm.Result, factor(p.sw$locs), median, na.rm =
TRUE)
sw.med.sum$D.MeHg.x = tapply(p.sw$Dissolved.Methyl.mercury.Ppm.Result, factor(p.sw$locs), mean, na.rm = TRUE)
write.csv(sw.med.sum, "SW summary.csv")
pdf("Params by Loc and Year.pdf", paper = "letter")
xyplot(Total.Mercury.Ppm.Result ~ year | locs.facd, data = p.sw, groups = season, type = "p", ylab = "Total Mercury
(ng/L)", col =
1:3, xlab = "Year", main = "Figure 4.2-1\nTotal Mercury Concentrations - Surface Water\n ", scales = list(x = list(tck = -
0.4,
relation = "same", alternating = F, cex = 0.6, rot = 45), y = list(tck = -0.4, relation = "same", alternating = 3, cex = 0.6)),
pch
= 16, par.strip.text = list(cex = 0.5), key = list(space = "top", text = list(c("spring","summer","fall")), col = 1:3, points =
list(pch = 16), columns = 3, cex = 0.8))
xyplot(Dissolved.Mercury.Ppm.Result ~ year | locs.facd, data = p.sw, groups = season, type = "p", ylab = "Dissolved
Mercury (ng/
L)", col = 1:3, xlab = "Year", main = "Figure 4.2-2\nDissolved Mercury Concentrations - Surface Water\n ", scales = list(x
=
list(tck = -0.4, relation = "same", alternating = F, cex = 0.6, rot = 45), y = list(tck = -0.4, relation = "same", alternating = 3,
cex = 0.6)), pch = 16, par.strip.text = list(cex = 0.5), key = list(space = "top", text = list(c("spring","summer","fall")), col =
1:3, points = list(pch = 16), columns = 3, cex = 0.8))
xyplot(Total.Methyl.mercury.Ppm.Result ~ year | locs.facd, data = p.sw, groups = season, type = "p", ylab = "Total
Methylmercury
(ng/L)", col = 1:3, xlab = "Year", main = "Figure 4.2-3\nTotal Methyl Mercury Concentrations - Surface Water\n ", scales =
list(x =
list(tck = -0.4, relation = "same", alternating = F, cex = 0.6, rot = 45), y = list(tck = -0.4, relation = "same", alternating = 3,
cex = 0.6)), pch = 16, par.strip.text = list(cex = 0.5), key = list(space = "top", text = list(c("spring","summer","fall")), col =
1:3, points = list(pch = 16), columns = 3, cex = 0.8))
xyplot(Dissolved.Methyl.mercury.Ppm.Result ~ year | locs.facd, data = p.sw, groups = season, type = "p", ylab =
"Dissolved
Methylmercury (ng/L)", col = 1:3, xlab = "Year", main = "Figure 4.2-4\nDissolved Methyl Mercury Concentrations - Surface
Water\n ",
scales = list(x = list(tck = -0.4, relation = "same", alternating = F, cex = 0.6, rot = 45), y = list(tck = -0.4, relation =
"same", alternating = 3, cex = 0.6)), pch = 16, par.strip.text = list(cex = 0.5), key = list(space = "top", text =
list(c("spring","summer","fall")), col = 1:3, points = list(pch = 16), columns = 3, cex = 0.8))
dev.off()
######################
### ANCOVA with TSS ###
######################
p.sw$u.d = "down"
p.sw$u.d[p.sw$locs == "Veazie"] = "up"
# T.Hg
hg.tss.lm = lm(Total.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result, data = p.sw)
hg.tss.res = resid(hg.tss.lm) # calculate residuals to evaluate them
plot(p.sw$Total.Suspended.Solids.Ppm.Result[!(is.na(p.sw$Total.Suspended.Solids.Ppm.Result) == T | is.na(p.sw
$Total.Mercury.Ppm.Result) == T)], hg.tss.res, ylab = "resids", xlab = "TSS")
abline(h = 0)
anova(lm(Total.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result * u.d, data = p.sw))
# model with interaction term to test slope
# T.MeHg
me.tss.lm = lm(Total.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result, data = p.sw)
me.tss.res = resid(me.tss.lm) # calculate residuals to evaluate them
plot(p.sw$Total.Suspended.Solids.Ppm.Result[!(is.na(p.sw$Total.Suspended.Solids.Ppm.Result) == T | is.na(p.sw
$Total.Methyl.mercury.Ppm.Result) == T)], me.tss.res, ylab = "resids", xlab = "TSS")
```

```
abline(h = 0)
anova(lm(log(Total.Methyl.mercury.Ppm.Result) ~ Total.Suspended.Solids.Ppm.Result * u.d, data = p.sw))
# model with interaction term to test slope
anova(lm(Total.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result + u.d, data = p.sw))
# test individual factors
summary(lm(Total.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result + u.d, data = p.sw))
# D.Hg
dhg.tss.lm = lm(Dissolved.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result, data = p.sw)
dhg.tss.res = resid(dhg.tss.lm) # calculate residuals to evaluate them
plot(p.sw$Total.Suspended.Solids.Ppm.Result[!(is.na(p.sw$Total.Suspended.Solids.Ppm.Result) == T | is.na(p.sw
$Dissolved.Mercury.Ppm.Result) == T)], dhg.tss.res, ylab = "resids", xlab = "TSS")
abline(h = 0)
anova(lm(Dissolved.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result * u.d, data = p.sw))
# model with interaction term to test slope
# D.MeHg
dme.tss.lm = lm(Dissolved.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result, data = p.sw)
dme.tss.res = resid(dme.tss.lm) # calculate residuals to evaluate them
plot(p.sw$Total.Suspended.Solids.Ppm.Result[!(is.na(p.sw$Total.Suspended.Solids.Ppm.Result) == T | is.na(p.sw
$Dissolved.Methyl.mercury.Ppm.Result) == T)], dme.tss.res, ylab = "resids", xlab = "TSS")
abline(h = 0)
anova(lm(Dissolved.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result * u.d, data = p.sw))
# model with interaction term to test slope
anova(lm(Dissolved.Methyl.mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result + u.d, data = p.sw))

sink("HG_TSS_Ancova.txt")
p.sw <- read.csv("p.sw_modified nsr lsv qcd.csv")
#assumes text.date read as "MM/DD/YYYY")
p.sw$year <- as.integer(substring(p.sw$text.date,7,10))
result1 <- aov(Total.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result * year, data = p.sw)
result2 <- aov(Total.Mercury.Ppm.Result ~ Total.Suspended.Solids.Ppm.Result + year, data = p.sw)
summary(result1)
summary(result2)
print(anova(result1,result2))
sink()
```